

Fermilab

Particle Physics Division/CDF Upgrade Project

DRAFT

**Specification for
Stereo XFT Finder Modules**

Introduction

The Stereo Finder Board is being designed in order to provide segment finding ability within the stereo COT layers. Segments are identified within “core” 4-cell units, where a cell represents a group of 12 COT wires. Additionally, each core worked on by the segment finding algorithm has access to neighbor wires. Figure 1 presents a snapshot of the wires used when segments are searched for within a 4-cell core.

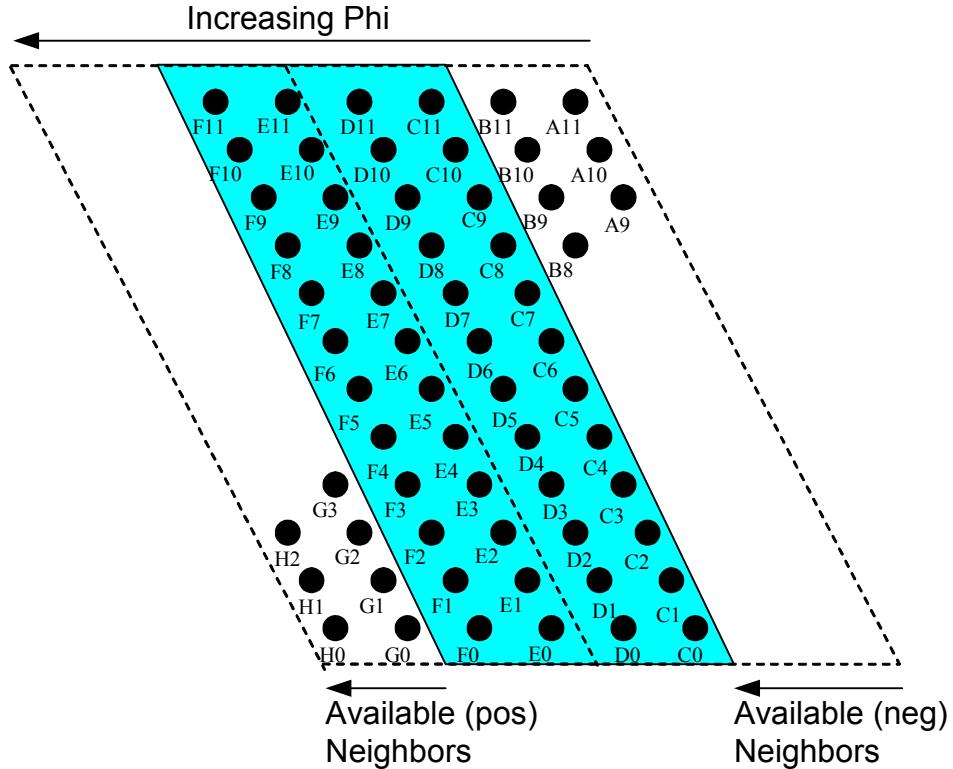


Figure 1. Stereo Finder 4-cell core unit and neighbor wires.

Finder Module Overview

The Stereo Finder module is being designed to fit into the standard CDF electronics infrastructure. It will be a 9Ux400mm module which conforms to the recommended specifications of CDF2388.

The Finder Module is being designed so that it can implement nine concurrent 4-cell segment finding algorithms. Segment finding algorithms will be implemented in Altera EP2S60F484C5ES FPGAs. Each FPGA can contain two segment finders.

Other than the backplane connection to VMEbus, all data entering and leaving the Stereo Finder is via optical data links. Up to 12 data fibers are used to input the COT wire information, up to 4 data links drive segment information to the SLAM board and a single link will be used to provide a data path into L2.

To implement these optical links, the Stereo Finder makes use of 4 channel mezzanine cards. Each Finder module will use three 4-channel “RX Mezzanine” input modules to receive COT data, a single 4-channel “TX Mezzanine” output module to drive segment data to the SLAM and another 4-channel “TX Mezzanine” output module located on a transition module which will drive L2 data.

Figure 2 provides a simple block diagram of the Stereo Finder Module.

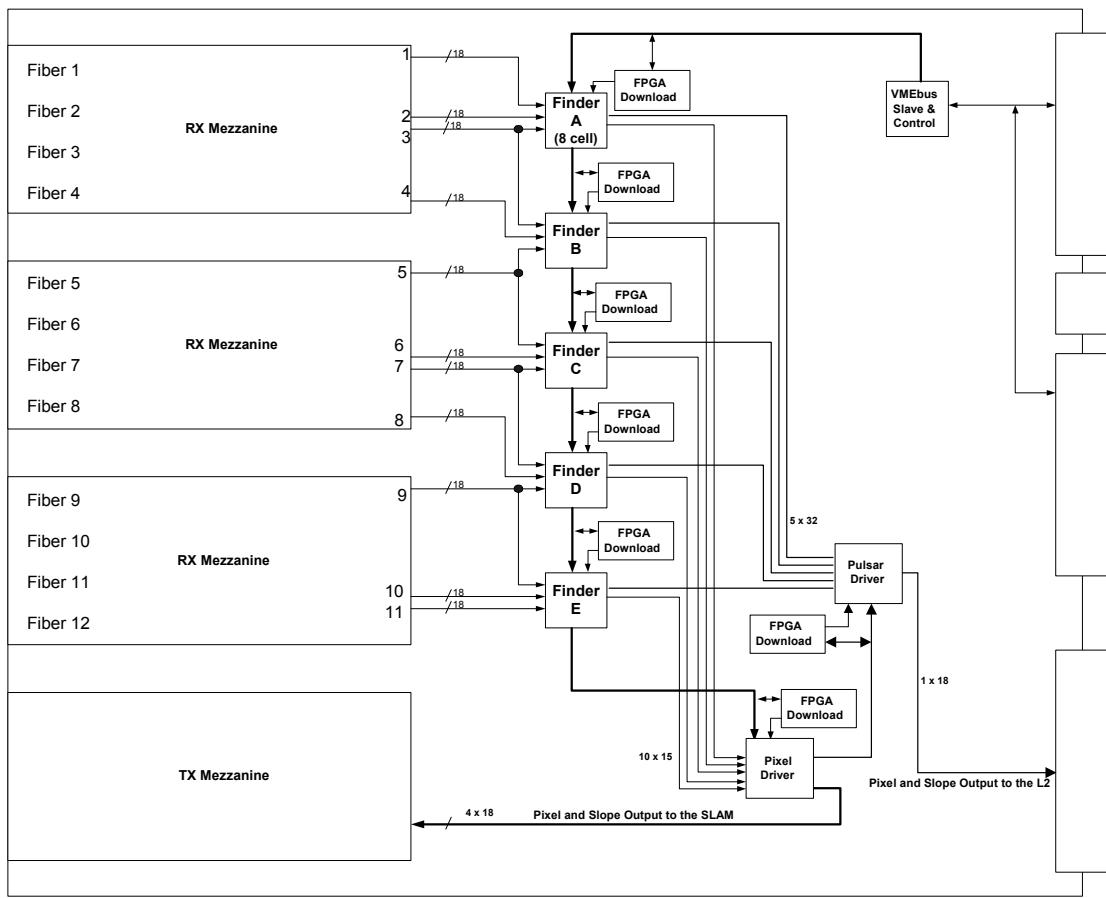


Figure 2. Stereo Finder Block Diagram

Details of Stereo XFT Data Source

The sources of the XFT data are TDC modules. Each of these modules contain timing information for 96 wires. The TDC produces 6 bits of timing information for each wire. This data identifies whether a wire has a “hit” on it for a particular time slice. There are 6 identified time slices within each 396ns period, or 3 CDF_Clock cycles.

In addition to sending up the hit information for each wire, it is desirable to tag the information with a Beam_Zero marker, to identify its position in time as well as some type of identification tag to mark the source of the data.

The plan is to send the data from the TDC modules to the XFT modules via an 8B/10B encoded serial optical bitstream. Furthermore, we would like to limit the data rate on such a link to ~1.25Gbps which is supported by a wide variety of commercial products available for Gigabit Ethernet.

The following tables show the data packing using a 16 bit SERDES part, the TI TLK1501. Each TDC Transition module will need to drive 2 optical fibers, each carrying the data from 48 wires. In some cases, the TDC transition module must drive an additional copy of one data set to allow for neighbor sharing on different XFT Stereo modules.

Figure 3 represents the 96 channels of wire information from a single TDC. It also illustrates the naming convention used in the data transmission scheme.

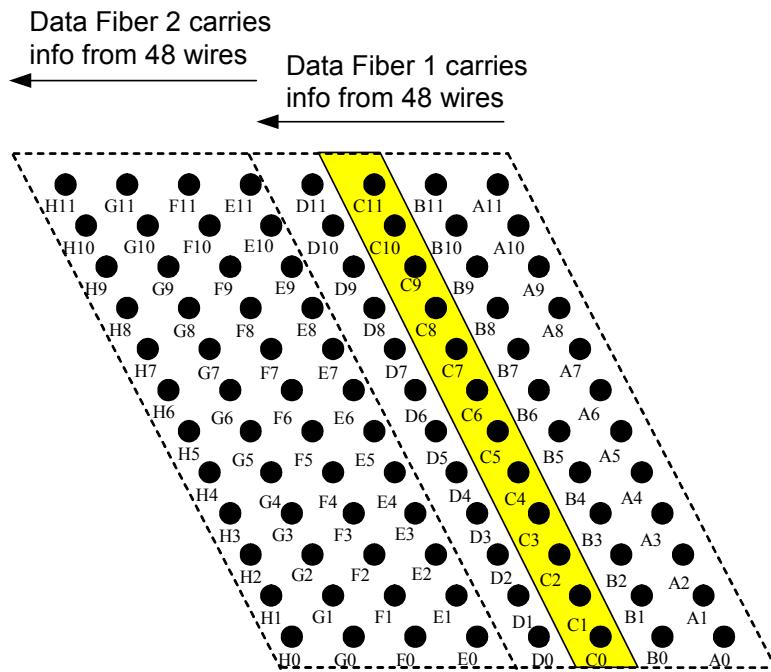


Figure 3. COT TDC Wire Map – Each TDC module spans 96 COT wires, or 8 Cells. A cell consists of 12 wires. An example cell has been hi-lighted above.

Data Fiber # 1 carries information from TDC wires 0-47

| Data Word | Beam_Zero Marker 1 bit | Word Zero Flag 1 bit | Group Identifies 2 bits | Wire data time slice (0-5) 12 bits |
|-----------|------------------------------|-------------------------|-------------------------------|--|
| 1 | beam_zero | 1 | 00 | t0 (A0-A11) |
| 2 | beam_zero | 1 | 01 | t0 (B0-B11) |
| 3 | beam_zero | 1 | 10 | t0 (C0-C11) |
| 4 | beam_zero | 1 | 11 | t0 (D0-D11) |
| 5 | beam_zero | 0 | 00 | t1 (A0-A11) |
| 6 | beam_zero | 0 | 01 | t1 (B0-B11) |
| 7 | beam_zero | 0 | 10 | t1 (C0-C11) |
| 8 | beam_zero | 0 | 11 | t1 (D0-D11) |
| 9 | beam_zero | 0 | 00 | t2 (A0-A11) |
| 10 | beam_zero | 0 | 01 | t2 (B0-B11) |
| 11 | beam_zero | 0 | 10 | t2 (C0-C11) |
| 12 | beam_zero | 0 | 11 | t2 (D0-D11) |
| 13 | beam_zero | 0 | 00 | t3 (A0-A11) |
| 14 | beam_zero | 0 | 01 | t3 (B0-B11) |
| 15 | beam_zero | 0 | 10 | t3 (C0-C11) |
| 16 | beam_zero | 0 | 11 | t3 (D0-D11) |
| 17 | beam_zero | 0 | 00 | t4 (A0-A11) |
| 18 | beam_zero | 0 | 01 | t4 (B0-B11) |
| 19 | beam_zero | 0 | 10 | t4 (C0-C11) |
| 20 | beam_zero | 0 | 11 | t4 (D0-D11) |
| 21 | beam_zero | 0 | 00 | t5 (A0-A11) |
| 22 | beam_zero | 0 | 01 | t5 (B0-B11) |
| 23 | beam_zero | 0 | 10 | t5 (C0-C11) |
| 24 | beam_zero | 0 | 11 | t5 (D0-D11) |

Note: “beam_zero” represents the state of the CDF Beam_Zero gate. It will be set high for an event occurring in the beam zero bucket and will be low otherwise.

Data Fiber # 2 carries information from TDC wires 48-95

| Data Word | Beam_Zero Marker 1 bit | Word Zero Flag 1 bit | Group Identifies 2 bits | Wire data time slice (0-5) 12 bits |
|-----------|------------------------------|-------------------------|-------------------------------|--|
| 1 | beam_zero | 1 | 00 | t0 (E0-E11) |
| 2 | beam_zero | 1 | 01 | t0 (F0-F11) |
| 3 | beam_zero | 1 | 10 | t0 (G0-G11) |
| 4 | beam_zero | 1 | 11 | t0 (H0-H11) |
| 5 | beam_zero | 0 | 00 | t1 (E0-E11) |
| 6 | beam_zero | 0 | 01 | t1 (F0-F11) |
| 7 | beam_zero | 0 | 10 | t1 (G0-G11) |
| 8 | beam_zero | 0 | 11 | t1 (H0-H11) |
| 9 | beam_zero | 0 | 00 | t2 (E0-E11) |
| 10 | beam_zero | 0 | 01 | t2 (F0-F11) |
| 11 | beam_zero | 0 | 10 | t2 (G0-G11) |
| 12 | beam_zero | 0 | 11 | t2 (H0-H11) |
| 13 | beam_zero | 0 | 00 | t3 (E0-E11) |
| 14 | beam_zero | 0 | 01 | t3 (F0-F11) |
| 15 | beam_zero | 0 | 10 | t3 (G0-G11) |
| 16 | beam_zero | 0 | 11 | t3 (H0-H11) |
| 17 | beam_zero | 0 | 00 | t4 (E0-E11) |
| 18 | beam_zero | 0 | 01 | t4 (F0-F11) |
| 19 | beam_zero | 0 | 10 | t4 (G0-G11) |
| 20 | beam_zero | 0 | 11 | t4 (H0-H11) |
| 21 | beam_zero | 0 | 00 | t5 (E0-E11) |
| 22 | beam_zero | 0 | 01 | t5 (F0-F11) |
| 23 | beam_zero | 0 | 10 | t5 (G0-G11) |
| 24 | beam_zero | 0 | 11 | t5 (H0-H11) |

The Finder Algorithm

The Stereo Finder FPGAs have the job of identifying track segments in a given stereo superlayer of the COT. The Finders are implemented with Altera Stratix 2 EP2S60 Field Programmable Gate Arrays (FPGAs), specifically the Altera EP2S20F484C5ES. Finders flag “hits” by setting pixels that indicate the position and/or slope of an identified track segment. Each “4-cell” Finder FPGA will report 12 pixels and for each COT cell. Each Finder FPGA operates on two “4-cell” units.

The Stereo Finder FPGAs receive their inputs from 3 optical data cables driven by TDC transition modules. Each of these three optical cables contains 4-cells of information. In order to have the necessary neighbor information, the finder algorithm actually operates off the center 8 cells. It treats these center 8 cells as two “4-cell” units. The finder algorithm will either simultaneously process two “4-cell” units through two independent mask sets, or cycle both “4-cell” units through a single mask set at twice the speed. See Figure 4.

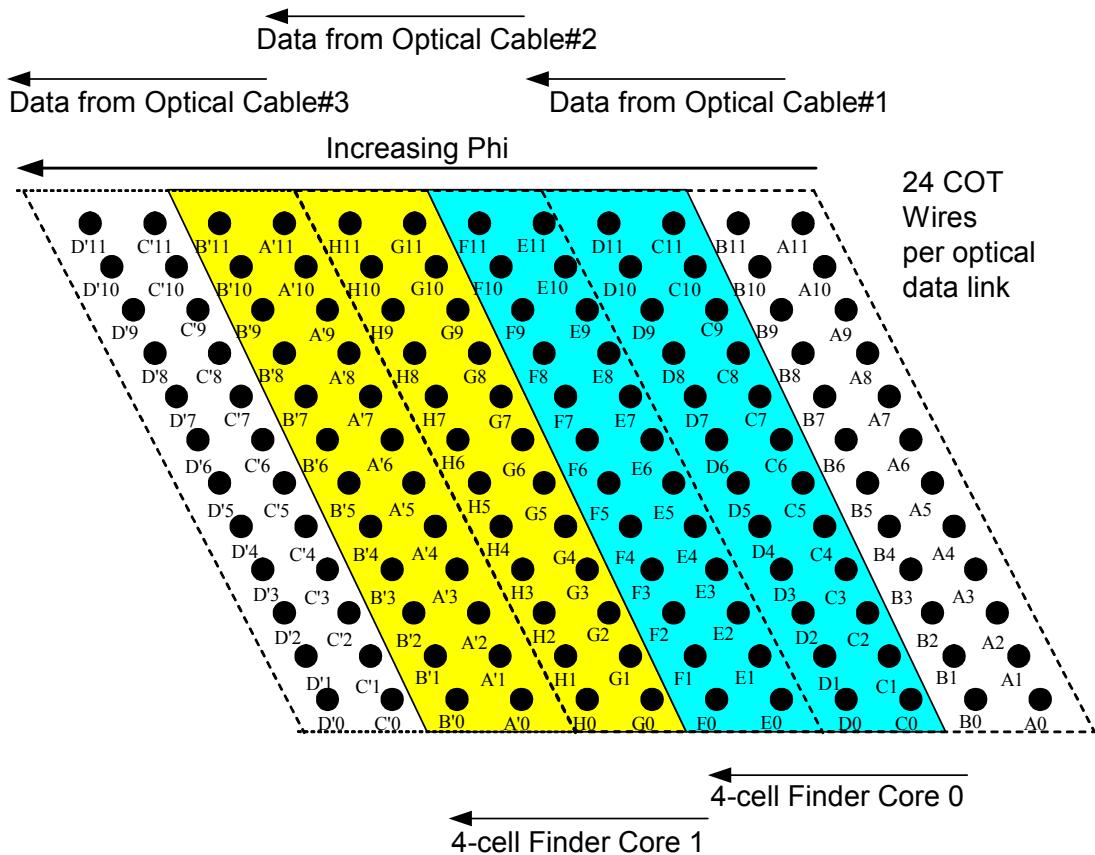
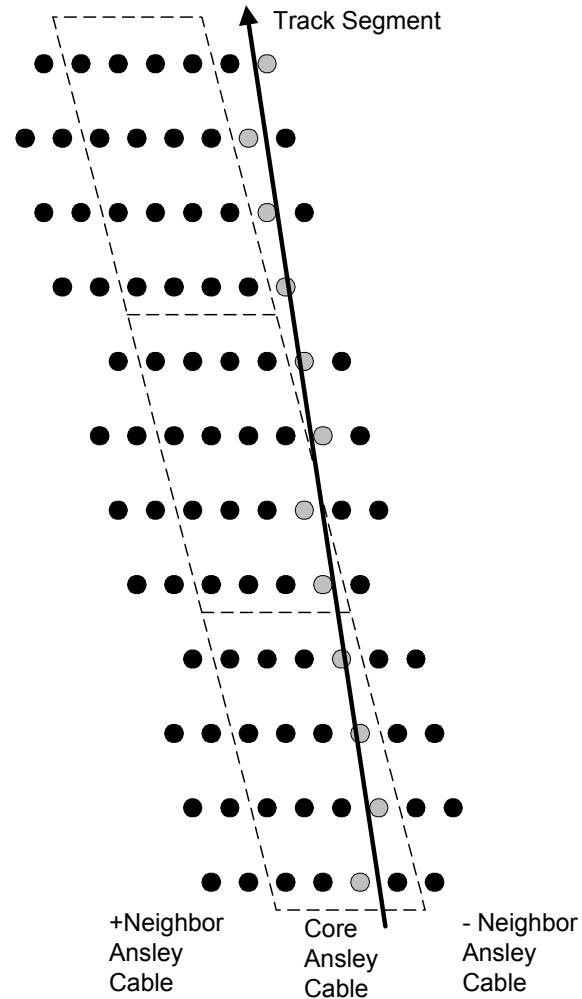


Figure 4. Finder FPGAs will operate on two 4-cell Finder cores

A “hit” is identified to have occurred whenever at least 9, 10 or 11 out of 12 wires in a mask have been hit. Figure 5 shows a mask set(gray dots) of 12 wires that may be used to identify the sample track passing through a given 4-cell grouping.

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A “hit” is identified to have occurred whenever at least 9, 10 or 11 out of 12 wires in a mask have been hit. Figure 5 shows a mask set(gray dots) of 12 wires that may be used to identify the sample track passing through a given 4-cell grouping.



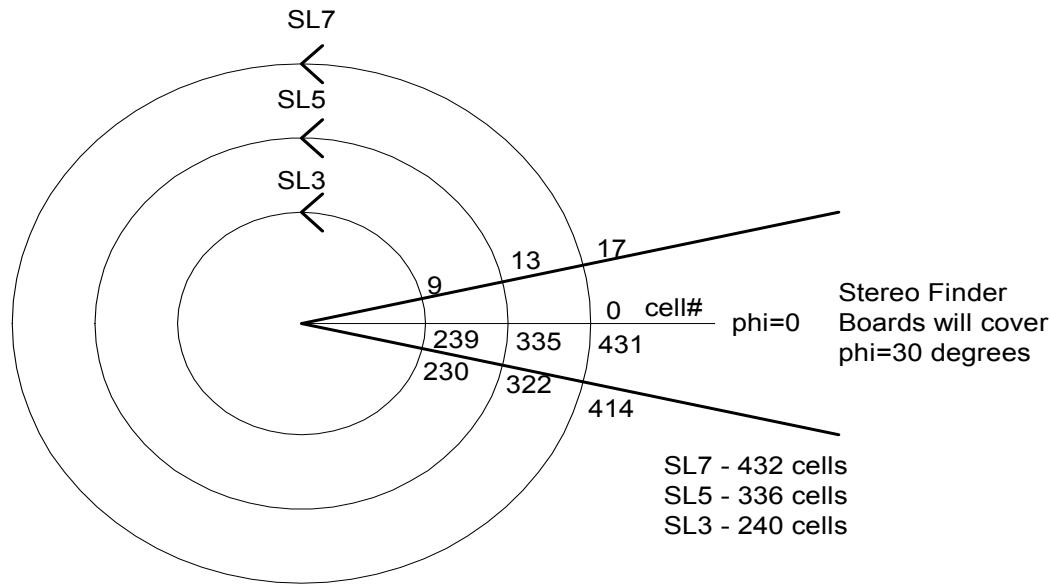
Gray Wires indicate 12 wire mask for the depicted track segment

Figure 5. Possible Mask Set for a Sample Track

The Pixel Driver

Each Stereo XFT Finder will cover a 30° phi slice. Figure XX illustrates which COT cells are covered by the first of 12 Finder modules required for SL3, SL5 and SL7. For example, the first Stereo Finder board which instruments SL7 will cover COT cell groups 414-431 and 0-17. For each of these 36 cells, a 12 bit pixel field is produced by the Finders which needs to be sent to the SLAM modules.

To further illustrate this mapping, two tables are provided below showing which TDC fiber optic cables are plugged into the module and which onboard Finders produce the pixel information.



Stereo Finder Mapping to the COT

| Front Panel Fiber Input | TDC Cells | Finders Receiving Information |
|--------------------------------|------------------|--------------------------------------|
| 1 | 19-16 | A |
| 2 | 15-12 | A |
| 3 | 11-8 | A, B |
| 4 | 7-4 | B |
| 5 | 3-0 | B,C |
| 6 | 431-428 | C |
| 7 | 427-424 | C,D |
| 8 | 423-420 | D |
| 9 | 419-416 | D,E |
| 10 | 415-412 | E |

Table showing Fiber Input connections for first SL7 Stereo Finder

| Finder | Pixel Information Output for: |
|---------------|--------------------------------------|
| A | Cells 17-10 |
| B | Cells 9-2 |
| C | Cells 1-0, Cells 431-426 |
| D | Cells 425 – 418 |
| E | Cells 417-414 |

Table showing which SL7 Finder FPGA produces which pixel output

OPTION A- Each FINDER FPGA contains 2 mask sets, one for each 15° section

The below implementation assumes 2 mask sets in a Stereo Finder FPGA Design – each mask set finds pixels for 4 cells
(24 pixels from each Finder Chip to the Pixel Driver Chip)

| Finder | Time = 396/4 = 99ns | Time A | Time B | Time C | Time D |
|---------------|----------------------------|---------------|---------------|---------------|---------------|
| A | Mask Set #1 | Cell 17 | Cell 16 | Cell 15 | Cell 14 |
| A | Mask Set #2 | Cell 13 | Cell 12 | Cell 11 | Cell 10 |
| B | Mask Set #1 | Cell 9 | Cell 8 | Cell 7 | Cell 6 |
| B | Mask Set #2 | Cell 5 | Cell 4 | Cell 3 | Cell 2 |
| C | Mask Set #1 | Cell 1 | Cell 0 | Cell 431 | Cell 430 |
| C | Mask Set #2 | Cell 429 | Cell 428 | Cell 427 | Cell 426 |
| D | Mask Set #1 | Cell 425 | Cell 424 | Cell 423 | Cell 422 |
| D | Mask Set #2 | Cell 421 | Cell 420 | Cell 419 | Cell 418 |
| E | Mask Set #1 | Cell 417 | Cell 416 | Cell 415 | Cell 414 |

The Cell Pixel data must be sent off the board in two 15° slices. Two data paths will be used to provide these 15° paths. The first data path will contain data from cells 17-0 and the second data path will contain data from cells 431-414.

If no time is lost to re-organizing the data order, the fastest way to get this data offboard to the SLAM is to push the data into two FIFOs as it is created. A controller would then monitor the FIFO and whenever data is present, it would read the FIFO and send the word to a serializer which would then transmit the data over a Fiber optic cable to the SLAM board. This simple design would lead to the following data order being received by the SLAM:

| Data Word | FIFO A Data | FIFO B Data |
|------------------|--------------------|--------------------|
| 0 | Cell 17 | Cell 429 |
| 1 | Cell 13 | Cell 425 |
| 2 | Cell 9 | Cell 421 |
| 3 | Cell 5 | Cell 417 |
| 4 | Cell 1 | Cell 428 |
| 5 | Cell 16 | Cell 424 |
| 6 | Cell 12 | Cell 420 |
| 7 | Cell 8 | Cell 416 |
| 8 | Cell 4 | Cell 431 |
| 9 | Cell 0 | Cell 427 |
| 10 | Cell 15 | Cell 423 |
| 11 | Cell 11 | Cell 419 |
| 12 | Cell 7 | Cell 415 |
| 13 | Cell 3 | Cell 430 |
| 14 | Cell 14 | Cell 426 |
| 15 | Cell 10 | Cell 422 |
| 16 | Cell 6 | Cell 418 |
| 17 | Cell 2 | Cell 414 |

Please note that this is the data order in which information is sent out. Whenever there is not a word waiting in the FIFO, an “IDLE” pattern will be inserted in the data streams. These “IDLE” patterns help the links maintain sync and will smooth out the fact that we are transmitting data at a faster rate than we are actually providing it.

OPTION B- Each FINDER FPGA contains 1 mask set

The below implementation assumes 1 mask set in a Stereo Finder FPGA Design – each mask set finds pixels for 4 cells; two 15° sections are cycled through successively (12 pixels from each Finder Chip to the Pixel Driver Chip)

Time = 396/8 = 49.5ns

| Finder | TimeA | TimeB | TimeC | TimeD | TimeE | TimeF | TimeG | TimeH |
|--------|----------|----------|----------|----------|----------|----------|----------|----------|
| A | Cell 17 | Cell 16 | Cell 15 | Cell 14 | Cell 13 | Cell 12 | Cell 11 | Cell 10 |
| B | Cell 9 | Cell 8 | Cell 7 | Cell 6 | Cell 5 | Cell 4 | Cell 3 | Cell 2 |
| C | Cell 1 | Cell 0 | Cell 431 | Cell 430 | Cell 429 | Cell 428 | Cell 427 | Cell 426 |
| D | Cell 425 | Cell 424 | Cell 423 | Cell 422 | Cell 421 | Cell 420 | Cell 419 | Cell 418 |
| E | Cell 417 | Cell 416 | Cell 415 | Cell 414 | | | | |

The Cell Pixel data must be sent off the board in two 15° slices. Two data paths will be used to provide these 15° paths. The first data path will contain data from cells 17-0 and the second data path will contain data from cells 431-414.

If no time is lost to re-organizing the data order, the fastest way to get this data offboard to the SLAM is to push the data into two FIFOs as it is created. A controller would then monitor the FIFO and whenever data is present, it would read the FIFO and send the word to a serializer which would then transmit the data over a Fiber optic cable to the SLAM board. This simple design would lead to the following data order being received by the SLAM:

| Data Word | FIFO A Data | FIFO B Data |
|-----------|-------------|-------------|
| 0 | Cell 17 | Cell 425 |
| 1 | Cell 9 | Cell 417 |
| 2 | Cell 1 | Cell 424 |
| 3 | Cell 16 | Cell 416 |
| 4 | Cell 8 | Cell 431 |
| 5 | Cell 0 | Cell 423 |
| 6 | Cell 15 | Cell 415 |
| 7 | Cell 7 | Cell 430 |
| 8 | Cell 14 | Cell 422 |
| 9 | Cell 6 | Cell 414 |
| 10 | Cell 13 | Cell 429 |
| 11 | Cell 5 | Cell 421 |
| 12 | Cell 12 | Cell 428 |
| 13 | Cell 4 | Cell 420 |
| 14 | Cell 11 | Cell 427 |
| 15 | Cell 3 | Cell 419 |
| 16 | Cell 10 | Cell 426 |
| 17 | Cell 2 | Cell 418 |

Please note that this is the data order in which information is sent out. Whenever there is not a word waiting in the FIFO, an “IDLE” pattern will be inserted in the data streams. These “IDLE” patterns help the links maintain sync and will smooth out the fact that we are transmitting data at a faster rate than we are actually providing it.

Data transmission between Stereo Finder and the SLAM will make use of the same fiber optic and SERDES technology as that which has already been described in the TDC fiber optic data transmission section.

| Data Word | Beam_Zero Marker 1 bit | Start Event Flag 1 bit | End Event Flag 1 bits | Error Flag 1 bit | Pixel data 12 bits |
|------------------|---------------------------------------|---------------------------------------|--------------------------------------|-----------------------------|---------------------------------|
| 1 | beam_zero | 1 | 0 | error | 1 st cell data(11:0) |
| 2 | beam_zero | 0 | 0 | error | cell data(11:0) |
| 3 | beam_zero | 0 | 0 | error | cell data(11:0) |
| 4 | beam_zero | 0 | 0 | error | cell data(11:0) |
| ... | beam_zero | 0 | 0 | error | cell data(11:0) |
| N-1 | beam_zero | 0 | 0 | error | cell data(11:0) |
| N | beam_zero | 0 | 1 | error | last cell data(11:0) |

Possible Data Transmission Format between Stereo Finder and the SLAM

The L2 Driver

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Mezzanine Modules

The plan to instrument the optical links includes the production of two mezzanine cards which are based upon the Common Mezzanine Card (CMC) standard format. This card format was chosen not only for its convenience, but also its ability to be used with the CDF Pulsar module. The Pulsar module is used extensively in the CDF L2 system and provides a firmware programmable base upon which these mezzanine cards can be used and tested.

Due to the fact we want to plug into the Pulsar, we are already somewhat constrained in how we assign the pins on the mezzanine connectors. In addition, we found that some additional functionality is desired within the Stereo XFT system, and have added a third connector (J13) to the two connectors (J1 and J3) which are used on the Pulsar card. This third connector will carry signals which give us more control over the individual mezzanine modules, but is not necessary to its operation when plugged into the Pulsar.

The 4-Channel Transmitter Mezzanine

The 4-channel transmitter module will provide the following functionality:

- Provide a full 16 bit data path which operates up to 1.25Gbps
- Provide full function of transmitter control ability. (i.e. control of TX_ER, TX_EN bits of TLK1501)
- Provide individual channel control of reset function. (ENABLE)
- Provide a copy of the system clock chosen to the motherboard. (GTX_CLK)
- Selectable capability to run off a x8 CDF_Clock frequency or an oscillator.

The 4-Channel Receiver Mezzanine

The 4-channel receiver module will provide the following functionality:

- Provide a full 16 bit data path which operates up to 1.25Gbps
- Provide access to the individual status bits. (RX_ER, RX_DV)
- Provide access to individual receiver clocks. (RX_CLK)
- Provide a copy of the system clock chosen to the motherboard. (GTX_CLK)
- Selectable capability to run off a x8 CDF_Clock frequency or an oscillator.

Pulsar Card ID Assignments

CARD_ID bit 3:0:

1 1 1 1 SLINK card or nothing plugged in

0 0 1 0 Hotlink Tx card plugged in

0 0 1 1 Hotlink Rx card plugged in

0 0 0 0 Taxi Tx card plugged in
0 0 0 1 Taxi Rx card plugged in
0 1 0 0 XFT Optical Tx
0 1 0 1 XFT Optical Rx

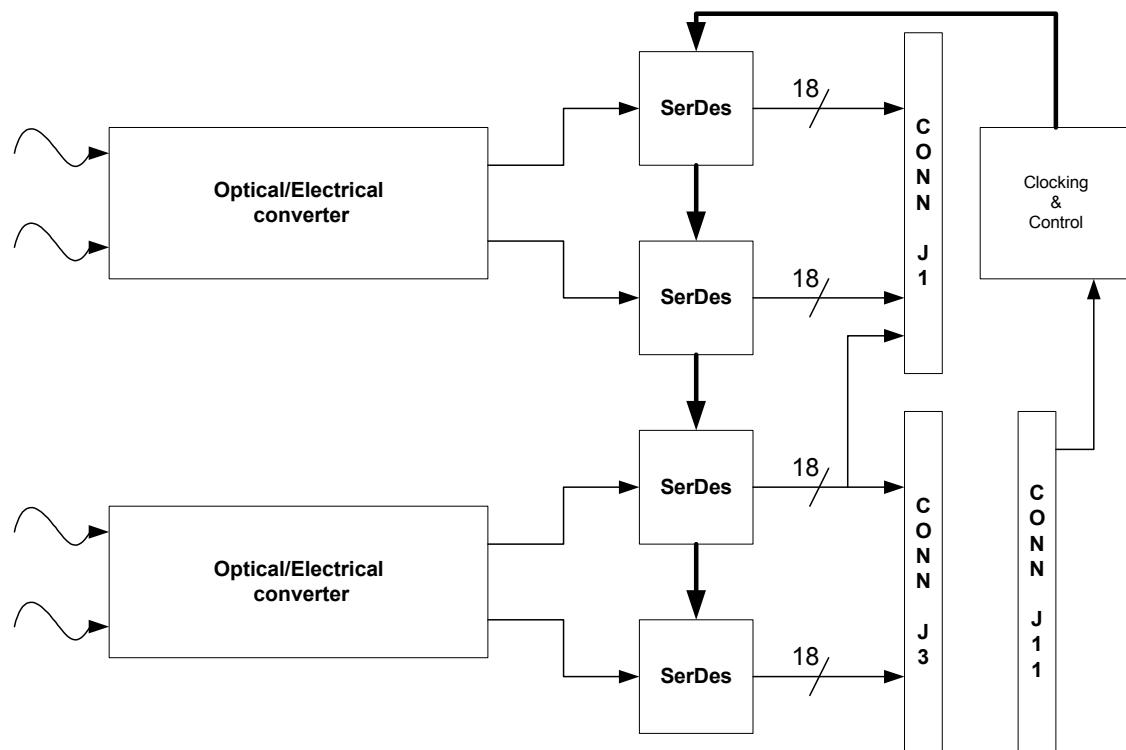


Figure 6. Block Diagram of the RX Mezzanine Board

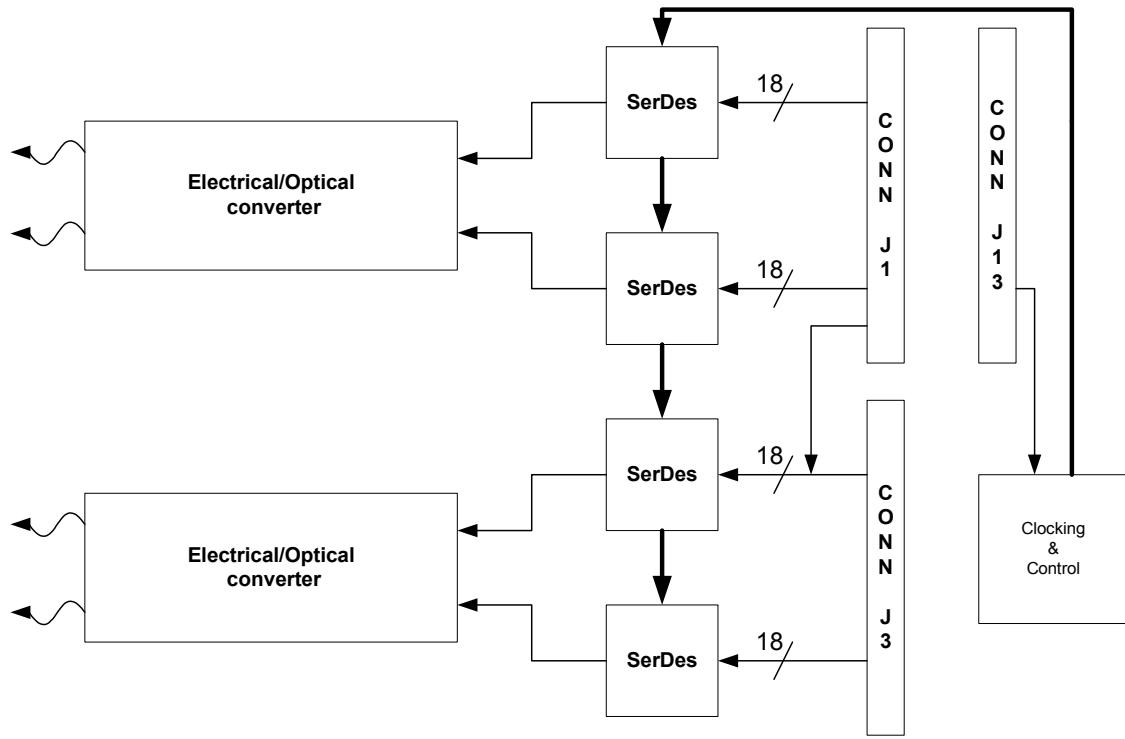


Figure 7. Block Diagram of the TX Mezzanine Board

FPGA Download

The five Altera EP2S60 FPGAs used in the implementation of the Finder chips as well as the single FPGA used to collect and drive Pixel information off the board and the single FPGA used to drive L2 information off board will be capable of being downloaded independently and in parallel. Furthermore, there will be enough Flash memory on the download devices to hold at least two copies of the firmware. The copy downloaded at power-up will always default to “firmware copy 1”; however, a software switch and command will make it possible to quickly download “firmware copy 2”. Both copies of Flash RAM will be capable of being downloaded via the VMEbus.

Furthermore, the FPGAs will also be capable of being downloaded through a JTAG connection, or through an Altera download cable, provided the proper switch settings are enabled.

The FPGA which is used to implement the VMEbus slave interface will be downloaded from a Flash based PROM at power up. The VMEbus slave FPGA and its download PROM are both addressable and capable of being downloaded via JTAG as well.

JTAG- Boundary Scan

A JTAG-Boundary Scan chain is implemented on the Stereo Finder board to provide a method for testing the module for infrastructure and interconnect defects. There is the possibility of using the chain as a method for programming the FPGAs and Flash RAM devices. The JTAG chain connects to all FPGAs and download devices. All boundary scan signals are buffered and fanned out with the use of a CY74FCT162244 16 bit buffer. The TCK and TMS lines are fanned out through six outputs. The Corelis Inc. ScanPlus software will be used for testing, debugging and programming the Finder boards.

Power

The Stereo Finder board will derive all power required from the 13 pins of +5V on the backplane. The estimated power requirements for the plug-on mezzanine modules and the Stereo Finder Motherboard are shown on the following two pages. Power requirements are summarized in the table below. DC-DC converters will be used to generate the +3.3V, +2.5V and +1.2V power rails. The +3.3V rail is generated by a Datel UNR-3.3/20-D5 DC-DC converter which is capable of delivering up to 20Amps of 3.3V.

+2.5V and +1.2V are produced by Datel's LSM-2.5/10-D3 and LSM-1.2/10-D3 respectively. Each of these is capable of providing up to 10Amps if it uses the +3.3V rail for conversion.

| Power Rail | Estimated Power (W) |
|-------------------|----------------------------|
| +5V | 0.5 |
| +3.3V | 15.2 |
| +2.5V | 6.6 |
| +1.2V | 4.9 |

RX Mezzanine Power Estimation

| item | qty | part number | part label | references | +3.3V (mw) | +2.5V (mw) |
|-----------------------|-----|-------------------------|------------------------------|------------------|------------|------------------|
| 1 | 3 | AMP 120527-1 | AMP 120527-1 60 Pin | J1,J3,J11 | 0 | 0 |
| 2 | 4 | CHICAGO LAMP 6200T1 | 6200T1 Red Led Right Angle | D1-D4 | 0 | 0 |
| 3 | 1 | CO4610-62.500-TR | 62.500MHz co46 | X1 | 148.5 | 148.5 |
| 4 | 14 | ERJ-3EKF36R5V | 36.5ohms_1%_.0625W | R46-R59 | 0 | 0 |
| 5 | 16 | ERJ-6ENF49R9V | 49.9ohms_1%_.1W | R27-R42 | 0 | 0 |
| 6 | 1 | ERJ-6ENF90R0V | 90.9ohms_1%_.1W | R61 | 0 | 0 |
| 7 | 6 | ERJ-6ENF1001V | 1.00Kohms_1%_.1W | R5-R10 | 0 | 0 |
| 8 | 3 | ERJ-6ENF1002V | 10.0Kohms_1%_.1W | R43-R45 | 0 | 0 |
| 9 | 4 | ERJ-6ENF1003V | 100Kohms_1%_.1W | R1-R4 | 0 | 0 |
| 10 | 1 | ERJ-6ENF1300V | 130ohms_1%_.1W | R60 | 0 | 0 |
| 11 | 8 | ERJ-6ENF2000V | 200ohms_1%_.1W | R15-R22 | 0 | 0 |
| 12 | 4 | ERJ-6ENF2210V | 221ohms_1%_.1W | R11-R14 | 0 | 0 |
| 13 | 4 | ERJ-6ENF8060V | 806ohms_1%_.1W | R23-R26 | 0 | 0 |
| 14 | 1 | ICS670-01 | ICS670-01 so16 | U5 | 405 | 405 |
| 15 | 3 | JUMPER BERG 2PINx2.54mm | JUMPER BERG 2PINx2.54mm | J14-J16 | 0 | 0 |
| 16 | 4 | KEMET C0805C102J5GACTU | 1000pf C0805 5% 50wvdc | C1-C4 | 0 | 0 |
| 17 | 1 | MPC9446FA | MPC9446FA sqfp7x7-32 | U8 | 0 | 0 |
| 18 | 2 | M2R-25-4-1-TL | M2T-25--4-1-TL m2r/t | J12-J13 | 825 | 1650 |
| 19 | 7 | PAN ECJ-2VB1H103K | .01uf C0805 10% 50wvdc | BP76-BP82 | 0 | 0 |
| 20 | 75 | PAN ECJ-2YB1H104K | .1uf C0805 10% 50wvdc | BP1-BP75 | 0 | 0 |
| 21 | 29 | PAN ECS-T1AZ335R | 3.3uf C2012 20% 10wvdc | C5-C33 | 0 | 0 |
| 22 | 20 | Pan EXB-V8V470JV | 47 ohms X 4, so8_mod_pan_v8v | RN1-RN20 | 0 | 0 |
| 23 | 1 | SIP6 | SIP6 | J17 | 0 | 0 |
| 24 | 1 | SN74LVC1G08DCKR | SN74LVC1G08DCKR sc88a | U6 | 231 | 231 |
| 25 | 4 | Steward-LI0603G221R-00 | 220ohm 700ma L0603 | L1-L4 | 0 | 0 |
| 26 | 14 | Steward-MI0805J070R-00 | 7ohm 1000ma L0805 | L5-L18 | 0 | 0 |
| 27 | 21 | TEST POINT SM | Test Point 18-25th Dia pin | TP1-TP21 | 0 | 0 |
| 28 | 4 | TLK1501IRCP | TLK1501IRCP sqfp10x10-64 | U1-U4 | 0 | 350 |
| 29 | 1 | XC95144XL-5TQ100C | Xilinx CPLD | U7 | 200 | 200 |
| Total Parts Used: 257 | | | | Total +3.3V (mw) | 2634.5 | Total +2.5V (mw) |
| | | | | | | 1400 |

Stereo Finder Power Estimation

| item | qty | part number | part label | +5V (mw) | +3.3V (mw) | +2.5V (mw) | +1.2V (mw) |
|------------------------|-----|--------------------------------|--------------------------------|----------------|------------------|------------------|------------------|
| 1 | 1 | ALCO TSPDSTD11CGRA0 | SPST Push Button Right Angle | 0 | 0 | 0 | 0 |
| 2 | 12 | AMP 120521-1 | AMP 120521-1 60 Pin | 0 | 0 | 0 | 0 |
| 3 | 1 | AMP 435704-8 | AMP 435704-8 | 0 | 0 | 0 | 0 |
| 4 | 1 | AT27LV256A-55JC | AT27LV256A-55JC plcc_r32 | 30 | 30 | 0 | 0 |
| 5 | 8 | CML 5682F1;1 | 5682F1;1 Dual Red Led RA | 0 | 33 | 264 | 0 |
| 6 | 7 | CML 5682F7;7 | 5682F7;7 Dual Yellow Led RA | 0 | 33 | 231 | 0 |
| 7 | 1 | CO4610-62.5000-TR | 62.500MHz co46 | 0 | 148.5 | 148.5 | 0 |
| 8 | 3 | CTS 770-61-R10K | 10K ohms X 5. sip6 | 0 | 0 | 0 | 0 |
| 9 | 15 | EPC16UC88 | EPC16UC88 ubga88 | 0 | 100 | 1500 | 0 |
| 10 | 8 | EP2560F484C3ES | EP2S60F484C3ES bga484 | 0 | 95 | 760 | 95 |
| 11 | 335 | ERJ-3EKF36R5V | 36.5ohms_1%_0625W | 0 | 0 | 0 | 0 |
| 12 | 10 | ERJ-3EKF82R5V | 82.5ohms_1%_0625W | 0 | 0 | 0 | 0 |
| 13 | 79 | ERJ-3EKF1001V | 1.00Kohms_1%_0625W | 0 | 0 | 0 | 0 |
| 14 | 4 | ERJ-3EKF1210V | 121ohms_1%_0625W | 0 | 0 | 0 | 0 |
| 15 | 10 | ERJ-3EKF1240V | 124ohms_1%_0625W | 0 | 0 | 0 | 0 |
| 16 | 1 | ERJ-3EKF2204V | 2.20Mohms_1%_0625W | 0 | 0 | 0 | 0 |
| 17 | 32 | ERJ-3EKF2320V | 232ohms_1%_0625W | 0 | 0 | 0 | 0 |
| 18 | 16 | ERJ-3EKF4751V | 4.75Kohms_1%_0625W | 0 | 0 | 0 | 0 |
| 19 | 1 | ERJ-3GEYJ5R6V | 5.6ohms_1%_0625W | 0 | 0 | 0 | 0 |
| 20 | 4 | ERJ-6ENF1004V | 1.00Mohms_1%_1W | 0 | 0 | 0 | 0 |
| 21 | 1 | ERNI 064784 | hm_raf_type_b_19pos_w_shield | 0 | 0 | 0 | 0 |
| 22 | 3 | HARTING 02 01 160 2101 | 5x32DIN RA 39tH Harting | 0 | 0 | 0 | 0 |
| 23 | 76 | JUMPER BERG 2PINx2.54mm | JUMPER BERG 2PINx2.54mm | 0 | 0 | 0 | 0 |
| 24 | 1 | KEMET T491X336M035AS | 33uf C7343_Mod 20% 35wvdc | 0 | 0 | 0 | 0 |
| 25 | 4 | LITTLEFUSE 154.010 | FUSE_BLOF 10Amp 125V | 0 | 0 | 0 | 0 |
| 26 | 1 | LSM-1.2/10-D3 | LSM-1.2/10-D3 datel case c45 | 0 | 0 | 0 | 0 |
| 27 | 1 | LSM-2.5/10-D3 | LSM-2.5/10-D3 datel case c45 | 0 | 0 | 0 | 0 |
| 28 | 1 | MC100EL11D | MC100EL11D soic8 | 150 | 150 | 0 | 0 |
| 29 | 1 | MC100VELT23D_PG | MC100VELT23D_PG soic8 | 0 | 100 | 100 | 0 |
| 30 | 1 | MC100VEL92DW | MC100VEL92DW so20w | 60 | 60 | 66 | 0 |
| 31 | 2 | MPC9446FA | MPC9446FA sqfp7x7-32 | 0 | 280 | 560 | 0 |
| 32 | 328 | PAN ECJ-1VB1A224K | .22uf C0603 10% 50wvdc | 0 | 0 | 0 | 0 |
| 33 | 19 | PAN ECJ-2YB1H104K | .1uf C0805 10% 50wvdc | 0 | 0 | 0 | 0 |
| 34 | 32 | PAN ECS-T1AC476R | .47uf C6032 20% 10wvdc | 0 | 0 | 0 | 0 |
| 35 | 34 | PAN ECS-T1CX106R | .10uf C3528 20% 16wvdc | 0 | 0 | 0 | 0 |
| 36 | 21 | PI5A100W | PI5A100W so16 | 0 | 0 | 0 | 0 |
| 37 | 16 | SN74ALVTH16827GR | SN74ALVTH16827GR tssop56 | 0 | 0 | 12.5 | 200 |
| 38 | 1 | SN74LS14D | SN74LS14D so14 | 100 | 100 | 0 | 0 |
| 39 | 1 | SN74LVC2G04DBVR | SN74LVC2G04DBKR ssop6_95mmsp | 0 | 5 | 5 | 0 |
| 40 | 1 | SN74LVC16244ADGGR | SN74LVC16244ADGGR tssop48 | 0 | 27 | 27 | 0 |
| 41 | 10 | SN74VMEH22501DGVR | SN74VMEH22501DGVR tssop48 | 0 | 99 | 990 | 0 |
| 42 | 1 | UNR-3.3/20-D5 | UNR-3.3/20-D5 datel case c21 | 0 | 0 | 0 | 0 |
| 43 | 7 | VISHAY 94SA227X0010FBP | 220uf 10x10.5mn 20% 10wvdc | 0 | 0 | 0 | 0 |
| 44 | 1 | VME_400_Bottom_Discharge_Strip | VME 400 Bottom Discharge Strip | 0 | 0 | 0 | 0 |
| 45 | 1 | VME_400_Top_Discharge_Strip | VME 400 Top Discharge Strip | 0 | 0 | 0 | 0 |
| 46 | 1 | 1N5817 | 1N5817 diode.107x.205b_.45sp | 0 | 0 | 0 | 0 |
| 47 | 10 | 3m2510-6003UB | 10 Pin Hdr_25th Sq pin_100x100 | 0 | 0 | 0 | 0 |
| 48 | 1 | 5KP5.0A | 5KP5.0A diode.360x.360b_.65sp | 0 | 0 | 0 | 0 |
| 49 | 1 | 74F38SC | 74F38SC so14 | 150 | 150 | 0 | 0 |
| 50 | 4 | Mezzanine | | 0 | 2635 | 10540 | 1400 |
| Total Parts Used: 1127 | | | | 490 | 15191.5 | 6560 | 4880 |
| | | | | Total +5V (mw) | Total +3.3V (mw) | Total +2.5V (mw) | Total +1.2V (mw) |

Memory Map

YY00 0000 Diagnostic Register (32 bits) (**R/W**)

YY00 0004 Control/Status (**R/W**)

| <u>Bit</u> | <u>Function</u> |
|------------|---|
| 31 | Software Reset (R/W) ?undefined right now |
| 30 | Force Program of Finder A FPGA (R/W) |
| 29 | Force Program of Finder B FPGA (R/W) |
| 28 | Force Program of Finder C FPGA (R/W) |
| 27 | Force Program of Finder D FPGA (R/W) |
| 26 | Force Program of Finder E FPGA (R/W) |
| 25 | Force Program of Pixel Driver FPGA (R/W) |
| 24 | Force Program of Pulsar Driver FPGA (R/W) |
| 23 | Force Program of VME Interface FPGA (R/W) |
| 22 | Select Flash Download Option (R/W) 0 - Select Programming Option 1 (Flash device 1) 1 – Select Programming Option 2 (Flash device 2) |
| 21 | Finders – Operate Mode (R/W) 1 – initiates Finder functions 0 – Finder/Pixel Driver in idle state |
| 20 | Finders – Software Reset (R/W) |
| 19 | Finders - Diagnostic Loop Mode (R/W) 1 - initiates looping pump out of data 0 - allows VMEbus Read/Write of Diagnostic RAM |
| 18 | Pixel Driver Opererate Mode (R/W) 1 – initiates Pixel Driver Functions 0 – Pixel Driver in idle state |
| 17 | Pixel Driver – Software Reset (R/W) |
| 16 | Pixel Driver - Diagnostic Loop Mode (R/W) 1 - initiates looping pump out of data 0 - allows VMEbus Read/Write of Diagnostic RAM |
| 15 | Pulsar (L2) Opererate Mode (R/W) 1 – initiates Pulsar (L2 data) Driver Functions 0 – Pulsar Driver in idle state |
| 14 | Pulsar Driver – Software Reset (R/W) |
| 13 | Pulsar Driver - Diagnostic Loop Mode (R/W) 1 - initiates looping pump out of data 0 - allows VMEbus Read/Write of Diagnostic RAM |
| 12 | Mask Error (R/W) |
| 11 | VME Slave Interface - Download Complete (R) |
| 10 | Finder A - Download Complete (R) |
| 9 | Finder B - Download Complete (R) |
| 8 | Finder C - Download Complete (R) |
| 7 | Finder D - Download Complete (R) |
| 6 | Finder E - Download Complete (R) |

| | |
|---|---|
| 6 | Pixel Driver - Download Complete (R) |
| 4 | Pulsar (L2) Driver - Download Complete (R) |
| 3 | Undefined (R) |
| 2 | Undefined (R) |
| 1 | Ready (R) |
| 0 | Error (R) |

Note: The front panel reset button will cause all of the FPGA's on the board to be reconfigured with the contents of the appropriate Flash RAM or serial EPROM. The Control register bits are not self-clearing, the user needs to set the bit and then clear the bit. i.e. in order to force a download or reset a chip the user should set the bit and then clear it. In the case of loop modes the user should set the bit during a loop test and then clear it after the loop test.

YY00 0008 Level 2 Header Word - Pipeline Length in 132ns time slices(**R/W**)

Description: Depth of pipeline will be 42 minus the number of stages in pre-Finder FPGA circuitry.

Bit Function

24-31 Programmable pipeline depth

YY00 000C Level 2 Header Word - Pipeline Offset in 132ns time slices(**R/W**)

Description: Offset will equal number of stages in pre-Finder FPGA circuitry. This is the value that is subtracted from 42 to determine the Pipeline length above.

Bit Function

24-31 Programmable pipeline depth offset

YY00 0010 Flash RAM Bank Select Register (R/W)

Bit Function

| | |
|-------|------------------------------|
| 31-14 | Undefined |
| 13 | Finder A Firmware Copy1 |
| 12 | Finder A Firmware Copy2 |
| 11 | Finder B Firmware Copy1 |
| 10 | Finder B Firmware Copy2 |
| 9 | Finder C Firmware Copy1 |
| 8 | Finder C Firmware Copy2 |
| 7 | Finder D Firmware Copy1 |
| 6 | Finder D Firmware Copy2 |
| 5 | Finder E Firmware Copy1 |
| 4 | Finder E Firmware Copy2 |
| 3 | Pixel Driver Firmware Copy1 |
| 2 | Pixel Driver Firmware Copy2 |
| 1 | Pulsar Driver Firmware Copy1 |
| 0 | Pulsar Driver Firmware Copy2 |

Note: While writing Flash RAM, it will be possible to select multiple Flash Rams to allow for parallel loading. However, when reading the Flash, only the Flash selected by the bit with the least significance will be read.

YY00 00014 Flash RAM Write Status Bit (**R**)

| <u>Bit</u> | <u>Function</u> |
|------------|---|
| 31-14 | Undefined |
| 13 | Finder A Copy1 – Write Status Bit RY/*BY |
| 12 | Finder A Copy2 – Write Status Bit RY/*BY |
| 11 | Finder B Copy1 – Write Status Bit RY/*BY |
| 10 | Finder B Copy2 – Write Status Bit RY/*BY |
| 9 | Finder C Copy1 – Write Status Bit RY/*BY |
| 8 | Finder C Copy2 – Write Status Bit RY/*BY |
| 7 | Finder D Copy1 – Write Status Bit RY/*BY |
| 6 | Finder D Copy2 – Write Status Bit RY/*BY |
| 5 | Finder E Copy1 – Write Status Bit RY/*BY |
| 4 | Finder E Copy2 – Write Status Bit RY/*BY |
| 3 | Pixel Driver Copy1 – Write Status Bit RY/*BY |
| 2 | Pixel Driver Copy2 – Write Status Bit RY/*BY |
| 1 | Pulsar Driver Copy1 – Write Status Bit RY/*BY |
| 0 | Pulsar Driver Copy2 – Write Status Bit RY/*BY |

YY00 0018 RX Mezzanine Control Bits (**R/W**)

| <u>Bit</u> | <u>Function</u> |
|------------|-------------------------|
| 31-12 | Undefined |
| 11 | RX Mezzanine 3 - ENABLE |
| 10 | RX Mezzanine 2 – ENABLE |
| 9 | RX Mezzanine 1 - ENABLE |
| 8 | RX Mezzanine 3 - ACTIVE |
| 7 | RX Mezzanine 2 – ACTIVE |
| 6 | RX Mezzanine 1 - ACTIVE |
| 5 | RX Mezzanine 3 – OSC_ON |
| 4 | RX Mezzanine 2 – OSC_ON |
| 3 | RX Mezzanine 1 - OSC_ON |
| 2 | RX Mezzanine 3 – RESET |
| 1 | RX Mezzanine 2 – RESET |
| 0 | RX Mezzanine 1 - RESET |

YY00 001C RX Channel Enable Bits (**R/W**)

| <u>Bit</u> | <u>Function</u> |
|------------|------------------------|
| 31-12 | Undefined |
| 11 | RX Channel 12 - ENABLE |
| 10 | RX Channel 11 – ENABLE |
| 9 | RX Channel 10 - ENABLE |
| 8 | RX Channel 9 - ENABLE |
| 7 | RX Channel 8 – ENABLE |

| | |
|---|-----------------------|
| 6 | RX Channel 7 - ENABLE |
| 5 | RX Channel 6 - ENABLE |
| 4 | RX Channel 5 – ENABLE |
| 3 | RX Channel 4 - ENABLE |
| 2 | RX Channel 3 - ENABLE |
| 1 | RX Channel 2 – ENABLE |
| 0 | RX Channel 1 - ENABLE |

YY00 0020 RX Channel LOOPEN Bits (**R/W**)

| Bit | Function |
|------------|------------------------|
| 31-12 | Undefined |
| 11 | RX Channel 12 - LOOPEN |
| 10 | RX Channel 11 – LOOPEN |
| 9 | RX Channel 10 - LOOPEN |
| 8 | RX Channel 9 - LOOPEN |
| 7 | RX Channel 8 – LOOPEN |
| 6 | RX Channel 7 - LOOPEN |
| 5 | RX Channel 6 - LOOPEN |
| 4 | RX Channel 5 – LOOPEN |
| 3 | RX Channel 4 - LOOPEN |
| 2 | RX Channel 3 - LOOPEN |
| 1 | RX Channel 2 – LOOPEN |
| 0 | RX Channel 1 - LOOPEN |

YY00 0024 RX Channel PRBSEN Bits (**R/W**)

| Bit | Function |
|------------|------------------------|
| 31-12 | Undefined |
| 11 | RX Channel 12 - PRBSEN |
| 10 | RX Channel 11 – PRBSEN |
| 9 | RX Channel 10 - PRBSEN |
| 8 | RX Channel 9 - PRBSEN |
| 7 | RX Channel 8 – PRBSEN |
| 6 | RX Channel 7 - PRBSEN |
| 5 | RX Channel 6 - PRBSEN |
| 4 | RX Channel 5 – PRBSEN |
| 3 | RX Channel 4 - PRBSEN |
| 2 | RX Channel 3 - PRBSEN |
| 1 | RX Channel 2 – PRBSEN |
| 0 | RX Channel 1 - PRBSEN |

YY00 0028 TDC Input Data Status (**R**)

| Bit | Function |
|------------|----------------------------|
| 31-10 | Undefined |
| 9 | Finder E – Beam Zero Error |
| 8 | Finder D – Beam Zero Error |
| 7 | Finder C – Beam Zero Error |

| | |
|---|-----------------------------|
| 6 | Finder B – Beam Zero Error |
| 5 | Finder A – Beam Zero Error |
| 4 | Finder E – First Word Error |
| 3 | Finder D – First Word Error |
| 2 | Finder C – First Word Error |
| 1 | Finder B – First Word Error |
| 0 | Finder A – First Word Error |

YY10 0000 - YY10 007F ID PROM (upper 8 bits) **(R)**

Finder A – Internal Status and Control

- YY20 0000 Firmware ID Register (**R**)
Read only register which contains unique Firmware Identifier
- YY20 0004 Status/Control Register
- YY20 0008 Input A – Status & Link Error Count
- YY20 000C Input B – Status & Link Error Count
- YY20 0010 Input C – Status & Link Error Count
- YY20 0014 Dead Wire Register 1
- YY20 0018 Dead Wire Register 2
- YY20 001C Dead Wire Register 3
- YY20 0020 Dead Wire Register 4
- YY20 0024 Dead Wire Register 5
- YY20 0028 Pipeline Depth Register
-
- YY20 00BC - YY20 0040 Input A FIFO Data (input buffer/diagnostic)
- YY20 013C - YY20 00C0 Input B FIFO Data (input buffer/diagnostic)
- YY20 01BC - YY20 0140 Input C FIFO Data (input buffer/diagnostic)
- YY20 023C - YY20 01C0 Output A FIFO Data (diagnostic)
- YY20 02BC - YY20 0240 Output B FIFO Data (diagnostic)

Finder B – Internal Status and Control

- YY30 0000 Firmware ID Register (R)
Read only register which contains unique Firmware Identifier
- YY30 0004 Status/Control Register
- YY30 0008 Input A – Status & Link Error Count
- YY30 000C Input B – Status & Link Error Count
- YY30 0010 Input C – Status & Link Error Count
- YY30 0014 Dead Wire Register 1
- YY30 0018 Dead Wire Register 2
- YY30 001C Dead Wire Register 3
- YY30 0020 Dead Wire Register 4
- YY30 0024 Dead Wire Register 5
- YY30 0028 Pipeline Depth Register
-
- YY30 00BC - YY30 0040 Input A FIFO Data (input buffer/diagnostic)
- YY30 013C - YY30 00C0 Input B FIFO Data (input buffer/diagnostic)
- YY30 01BC - YY30 0140 Input C FIFO Data (input buffer/diagnostic)
- YY30 023C - YY30 01C0 Output A FIFO Data (diagnostic)
- YY30 02BC - YY30 0240 Output B FIFO Data (diagnostic)

Finder C – Internal Status and Control

- YY40 0000 Firmware ID Register (R)
Read only register which contains unique Firmware Identifier
- YY40 0004 Status/Control Register
- YY40 0008 Input A – Status & Link Error Count
- YY40 000C Input B – Status & Link Error Count
- YY40 0010 Input C – Status & Link Error Count
- YY40 0014 Dead Wire Register 1
- YY40 0018 Dead Wire Register 2
- YY40 001C Dead Wire Register 3
- YY40 0020 Dead Wire Register 4
- YY40 0024 Dead Wire Register 5
- YY40 0028 Pipeline Depth Register
-
- YY40 00BC - YY40 0040 Input A FIFO Data (input buffer/diagnostic)
- YY40 013C - YY40 00C0 Input B FIFO Data (input buffer/diagnostic)
- YY40 01BC - YY40 0140 Input C FIFO Data (input buffer/diagnostic)
- YY40 023C - YY40 01C0 Output A FIFO Data (diagnostic)
- YY40 02BC - YY40 0240 Output B FIFO Data (diagnostic)

Finder D – Internal Status and Control

- YY50 0000 Firmware ID Register (R)
Read only register which contains unique Firmware Identifier
- YY50 0004 Status/Control Register
- YY50 0008 Input A – Status & Link Error Count
- YY50 000C Input B – Status & Link Error Count
- YY50 0010 Input C – Status & Link Error Count
- YY50 0014 Dead Wire Register 1
- YY50 0018 Dead Wire Register 2
- YY50 001C Dead Wire Register 3
- YY50 0020 Dead Wire Register 4
- YY50 0024 Dead Wire Register 5
- YY50 0028 Pipeline Depth Register
-
- YY50 00BC - YY50 0040 Input A FIFO Data (input buffer/diagnostic)
- YY50 013C - YY50 00C0 Input B FIFO Data (input buffer/diagnostic)
- YY50 01BC - YY50 0140 Input C FIFO Data (input buffer/diagnostic)
- YY50 023C - YY50 01C0 Output A FIFO Data (diagnostic)
- YY50 02BC - YY50 0240 Output B FIFO Data (diagnostic)

Finder E – Internal Status and Control

- YY60 0000 Firmware ID Register (R)
Read only register which contains unique Firmware Identifier
- YY60 0004 Status/Control Register
- YY60 0008 Input A – Status & Link Error Count
- YY60 000C Input B – Status & Link Error Count
- YY60 0010 Input C – Status & Link Error Count
- YY60 0014 Dead Wire Register 1
- YY60 0018 Dead Wire Register 2
- YY60 001C Dead Wire Register 3
- YY60 0020 Dead Wire Register 4
- YY60 0024 Dead Wire Register 5
- YY60 0028 Pipeline Depth Register
-
- YY60 00BC - YY60 0040 Input A FIFO Data (input buffer/diagnostic)
- YY60 013C - YY60 00C0 Input B FIFO Data (input buffer/diagnostic)
- YY60 01BC - YY60 0140 Input C FIFO Data (input buffer/diagnostic)
- YY60 023C - YY60 01C0 Output A FIFO Data (diagnostic)
- YY60 02BC - YY60 0240 Output B FIFO Data (diagnostic)

Pixel Driver – Internal Status and Control

YY70 0000 Firmware ID Register (R)
Read only register which contains unique Firmware Identifier

YY70 0004 Status/Control Register

.....

L2 Buffer Space (NOTE: All L2 Buffers are Read Only)

YY80 0000 L2 Buffer 0 Header Word

| <u>Bit</u> | <u>Function</u> |
|------------|---|
| 0-7 | Bunch ID: 8 bit counter from Bunch Zero |
| 8-12 | Geographical Address |
| 13-22 | Module Serial Number |
| 23-31 | Module Type |

YY80 0004 Finder A - Cell 0,1 Segment Information (segment info passed on bits 30:0)

| <u>Bit</u> | <u>Function</u> |
|------------|-----------------------|
| 0-11 | Cell 0 - Pixel (11:0) |
| 12 | Cell 0 - B0 Marker |
| 13 | Cell 0 - W0 Marker |
| 14 | Cell 0 - Error Marker |
| 15 | Undefined |
| 16-27 | Cell 1 - Pixel (11:0) |
| 28 | Cell 1 - B0 Marker |
| 29 | Cell 1 - W0 Marker |
| 30 | Cell 1 - Error Marker |
| 31 | Undefined |

YY80 0008 Finder A - Cell 2,3 Segment Information

YY80 000C Finder A - Cell 4,5 Segment Information

YY80 0010 Finder A - Cell 6,7 Segment Information

YY80 0014 Finder B - Cell 0,1 Segment Information

YY80 0018 Finder B - Cell 2,3 Segment Information

YY80 001C Finder B - Cell 4,5 Segment Information

YY80 0020 Finder B - Cell 6,7 Segment Information

YY80 0024 Finder C - Cell 0,1 Segment Information

YY80 0028 Finder C - Cell 2,3 Segment Information

YY80 002C Finder C - Cell 4,5 Segment Information

YY80 0030 Finder C - Cell 6,7 Segment Information

YY80 0034 Finder D - Cell 0,1 Segment Information

YY80 0038 Finder D - Cell 2,3 Segment Information

YY80 003C Finder D - Cell 4,5 Segment Information

YY80 0040 Finder D - Cell 6,7 Segment Information

YY80 0044 Finder E - Cell 0,1 Segment Information

YY80 0048 Finder E - Cell 2,3 Segment Information

YY80 005C Finder E - Cell 4,5 Segment Information

YY80 0060 Finder E - Cell 6,7 Segment Information

| YY80 0064 | Finder A - Wire Cell 0 Time Slice 0&1 Information | | | | | | | | | | | | |
|------------|---|------------|-----------------|------|-------------------------------|-------|-------------------------------|----|-----------|----|-----------|----|--------------|
| | <table border="0"> <thead> <tr> <th style="text-align: center;"><u>Bit</u></th><th style="text-align: center;"><u>Function</u></th></tr> </thead> <tbody> <tr> <td style="text-align: center;">0-11</td><td>Wire Data time slice 0 (11:0)</td></tr> <tr> <td style="text-align: center;">12-23</td><td>Wire Data time slice 1 (11:0)</td></tr> <tr> <td style="text-align: center;">24</td><td>B0 Marker</td></tr> <tr> <td style="text-align: center;">25</td><td>W0 Marker</td></tr> <tr> <td style="text-align: center;">26</td><td>Error Marker</td></tr> </tbody> </table> | <u>Bit</u> | <u>Function</u> | 0-11 | Wire Data time slice 0 (11:0) | 12-23 | Wire Data time slice 1 (11:0) | 24 | B0 Marker | 25 | W0 Marker | 26 | Error Marker |
| <u>Bit</u> | <u>Function</u> | | | | | | | | | | | | |
| 0-11 | Wire Data time slice 0 (11:0) | | | | | | | | | | | | |
| 12-23 | Wire Data time slice 1 (11:0) | | | | | | | | | | | | |
| 24 | B0 Marker | | | | | | | | | | | | |
| 25 | W0 Marker | | | | | | | | | | | | |
| 26 | Error Marker | | | | | | | | | | | | |
| YY80 0068 | Finder A - Wire Cell 0 Time Slice 2&3 Information | | | | | | | | | | | | |
| YY80 006C | Finder A - Wire Cell 0 Time Slice 4&5 Information | | | | | | | | | | | | |
| YY80 0070 | Finder A - Wire Cell 1 Time Slice 0&1 Information | | | | | | | | | | | | |
| YY80 0074 | Finder A - Wire Cell 1 Time Slice 2&3 Information | | | | | | | | | | | | |
| YY80 0078 | Finder A - Wire Cell 1 Time Slice 4&5 Information | | | | | | | | | | | | |
| YY80 007C | Finder A - Wire Cell 2 Time Slice 0&1 Information | | | | | | | | | | | | |
| YY80 0080 | Finder A - Wire Cell 2 Time Slice 2&3 Information | | | | | | | | | | | | |
| YY80 0084 | Finder A - Wire Cell 2 Time Slice 4&5 Information | | | | | | | | | | | | |
| YY80 0088 | Finder A - Wire Cell 3 Time Slice 0&1 Information | | | | | | | | | | | | |
| YY80 008C | Finder A - Wire Cell 3 Time Slice 2&3 Information | | | | | | | | | | | | |
| YY80 0090 | Finder A - Wire Cell 3 Time Slice 4&5 Information | | | | | | | | | | | | |
| YY80 0094 | Finder A - Wire Cell 4 Time Slice 0&1 Information | | | | | | | | | | | | |
| YY80 0098 | Finder A - Wire Cell 4 Time Slice 2&3 Information | | | | | | | | | | | | |
| YY80 009C | Finder A - Wire Cell 4 Time Slice 4&5 Information | | | | | | | | | | | | |
| YY80 00A0 | Finder A - Wire Cell 5 Time Slice 0&1 Information | | | | | | | | | | | | |
| YY80 00A4 | Finder A - Wire Cell 5 Time Slice 2&3 Information | | | | | | | | | | | | |
| YY80 00A8 | Finder A - Wire Cell 5 Time Slice 4&5 Information | | | | | | | | | | | | |
| YY80 00AC | Finder A - Wire Cell 6 Time Slice 0&1 Information | | | | | | | | | | | | |
| YY80 00B0 | Finder A - Wire Cell 6 Time Slice 2&3 Information | | | | | | | | | | | | |
| YY80 00B4 | Finder A - Wire Cell 6 Time Slice 4&5 Information | | | | | | | | | | | | |
| YY80 00B8 | Finder A - Wire Cell 7 Time Slice 0&1 Information | | | | | | | | | | | | |
| YY80 00BC | Finder A - Wire Cell 7 Time Slice 2&3 Information | | | | | | | | | | | | |
| YY80 00C0 | Finder A - Wire Cell 7 Time Slice 4&5 Information | | | | | | | | | | | | |
| YY80 00C4 | Finder B - Wire Cell 0 Time Slice 0&1 Information | | | | | | | | | | | | |
| YY80 00C8 | Finder B - Wire Cell 0 Time Slice 2&3 Information | | | | | | | | | | | | |
| YY80 00CC | Finder B - Wire Cell 0 Time Slice 4&5 Information | | | | | | | | | | | | |
| YY80 00D0 | Finder B - Wire Cell 1 Time Slice 0&1 Information | | | | | | | | | | | | |
| YY80 00D4 | Finder B - Wire Cell 1 Time Slice 2&3 Information | | | | | | | | | | | | |
| YY80 00D8 | Finder B - Wire Cell 1 Time Slice 4&5 Information | | | | | | | | | | | | |
| YY80 00DC | Finder B - Wire Cell 2 Time Slice 0&1 Information | | | | | | | | | | | | |
| YY80 00E0 | Finder B - Wire Cell 2 Time Slice 2&3 Information | | | | | | | | | | | | |
| YY80 00E4 | Finder B - Wire Cell 2 Time Slice 4&5 Information | | | | | | | | | | | | |
| YY80 00E8 | Finder B - Wire Cell 3 Time Slice 0&1 Information | | | | | | | | | | | | |
| YY80 00EC | Finder B - Wire Cell 3 Time Slice 2&3 Information | | | | | | | | | | | | |
| YY80 00F0 | Finder B - Wire Cell 3 Time Slice 4&5 Information | | | | | | | | | | | | |
| YY80 00F4 | Finder B - Wire Cell 4 Time Slice 0&1 Information | | | | | | | | | | | | |
| YY80 00F8 | Finder B - Wire Cell 4 Time Slice 2&3 Information | | | | | | | | | | | | |
| YY80 00FC | Finder B - Wire Cell 4 Time Slice 4&5 Information | | | | | | | | | | | | |

| | |
|-----------|---|
| YY80 0100 | Finder B - Wire Cell 5 Time Slice 0&1 Information |
| YY80 0104 | Finder B - Wire Cell 5 Time Slice 2&3 Information |
| YY80 0108 | Finder B - Wire Cell 5 Time Slice 4&5 Information |
| YY80 010C | Finder B - Wire Cell 6 Time Slice 0&1 Information |
| YY80 0110 | Finder B - Wire Cell 6 Time Slice 2&3 Information |
| YY80 0114 | Finder B - Wire Cell 6 Time Slice 4&5 Information |
| YY80 0118 | Finder B - Wire Cell 7 Time Slice 0&1 Information |
| YY80 011C | Finder B - Wire Cell 7 Time Slice 2&3 Information |
| YY80 0120 | Finder B - Wire Cell 7 Time Slice 4&5 Information |
| YY80 0124 | Finder C - Wire Cell 0 Time Slice 0&1 Information |
| YY80 0128 | Finder C - Wire Cell 0 Time Slice 2&3 Information |
| YY80 012C | Finder C - Wire Cell 0 Time Slice 4&5 Information |
| YY80 0130 | Finder C - Wire Cell 1 Time Slice 0&1 Information |
| YY80 0134 | Finder C - Wire Cell 1 Time Slice 2&3 Information |
| YY80 0138 | Finder C - Wire Cell 1 Time Slice 4&5 Information |
| YY80 013C | Finder C - Wire Cell 2 Time Slice 0&1 Information |
| YY80 0140 | Finder C - Wire Cell 2 Time Slice 2&3 Information |
| YY80 0144 | Finder C - Wire Cell 2 Time Slice 4&5 Information |
| YY80 0148 | Finder C - Wire Cell 3 Time Slice 0&1 Information |
| YY80 014C | Finder C - Wire Cell 3 Time Slice 2&3 Information |
| YY80 0150 | Finder C - Wire Cell 3 Time Slice 4&5 Information |
| YY80 0154 | Finder C - Wire Cell 4 Time Slice 0&1 Information |
| YY80 0158 | Finder C - Wire Cell 4 Time Slice 2&3 Information |
| YY80 015C | Finder C - Wire Cell 4 Time Slice 4&5 Information |
| YY80 0160 | Finder C - Wire Cell 5 Time Slice 0&1 Information |
| YY80 0164 | Finder C - Wire Cell 5 Time Slice 2&3 Information |
| YY80 0168 | Finder C - Wire Cell 5 Time Slice 4&5 Information |
| YY80 016C | Finder C - Wire Cell 6 Time Slice 0&1 Information |
| YY80 0170 | Finder C - Wire Cell 6 Time Slice 2&3 Information |
| YY80 0174 | Finder C - Wire Cell 6 Time Slice 4&5 Information |
| YY80 0178 | Finder C - Wire Cell 7 Time Slice 0&1 Information |
| YY80 017C | Finder C - Wire Cell 7 Time Slice 2&3 Information |
| YY80 0180 | Finder C - Wire Cell 7 Time Slice 4&5 Information |
| YY80 0184 | Finder D - Wire Cell 0 Time Slice 0&1 Information |
| YY80 0188 | Finder D - Wire Cell 0 Time Slice 2&3 Information |
| YY80 018C | Finder D - Wire Cell 0 Time Slice 4&5 Information |
| YY80 0190 | Finder D - Wire Cell 1 Time Slice 0&1 Information |
| YY80 0194 | Finder D - Wire Cell 1 Time Slice 2&3 Information |
| YY80 0198 | Finder D - Wire Cell 1 Time Slice 4&5 Information |
| YY80 019C | Finder D - Wire Cell 2 Time Slice 0&1 Information |
| YY80 01A0 | Finder D - Wire Cell 2 Time Slice 2&3 Information |
| YY80 01A4 | Finder D - Wire Cell 2 Time Slice 4&5 Information |
| YY80 01A8 | Finder D - Wire Cell 3 Time Slice 0&1 Information |
| YY80 01AC | Finder D - Wire Cell 3 Time Slice 2&3 Information |

| | |
|-----------|---|
| YY80 01B0 | Finder D - Wire Cell 3 Time Slice 4&5 Information |
| YY80 01B4 | Finder D - Wire Cell 4 Time Slice 0&1 Information |
| YY80 01B8 | Finder D - Wire Cell 4 Time Slice 2&3 Information |
| YY80 01BC | Finder D - Wire Cell 4 Time Slice 4&5 Information |
| YY80 01C0 | Finder D - Wire Cell 5 Time Slice 0&1 Information |
| YY80 01C4 | Finder D - Wire Cell 5 Time Slice 2&3 Information |
| YY80 01C8 | Finder D - Wire Cell 5 Time Slice 4&5 Information |
| YY80 01CC | Finder D - Wire Cell 6 Time Slice 0&1 Information |
| YY80 01D0 | Finder D - Wire Cell 6 Time Slice 2&3 Information |
| YY80 01D4 | Finder D - Wire Cell 6 Time Slice 4&5 Information |
| YY80 01D8 | Finder D - Wire Cell 7 Time Slice 0&1 Information |
| YY80 01DC | Finder D - Wire Cell 7 Time Slice 2&3 Information |
| YY80 01E0 | Finder D - Wire Cell 7 Time Slice 4&5 Information |
| | |
| YY80 01E4 | Finder E - Wire Cell 0 Time Slice 0&1 Information |
| YY80 01E8 | Finder E - Wire Cell 0 Time Slice 2&3 Information |
| YY80 01EC | Finder E - Wire Cell 0 Time Slice 4&5 Information |
| YY80 01F0 | Finder E - Wire Cell 1 Time Slice 0&1 Information |
| YY80 01F4 | Finder E - Wire Cell 1 Time Slice 2&3 Information |
| YY80 01F8 | Finder E - Wire Cell 1 Time Slice 4&5 Information |
| YY80 01FC | Finder E - Wire Cell 2 Time Slice 0&1 Information |
| YY80 0200 | Finder E - Wire Cell 2 Time Slice 2&3 Information |
| YY80 0204 | Finder E - Wire Cell 2 Time Slice 4&5 Information |
| YY80 0208 | Finder E - Wire Cell 3 Time Slice 0&1 Information |
| YY80 020C | Finder E - Wire Cell 3 Time Slice 2&3 Information |
| YY80 0210 | Finder E - Wire Cell 3 Time Slice 4&5 Information |
| YY80 0214 | Finder E - Wire Cell 4 Time Slice 0&1 Information |
| YY80 0218 | Finder E - Wire Cell 4 Time Slice 2&3 Information |
| YY80 021C | Finder E - Wire Cell 4 Time Slice 4&5 Information |
| YY80 0220 | Finder E - Wire Cell 5 Time Slice 0&1 Information |
| YY80 0224 | Finder E - Wire Cell 5 Time Slice 2&3 Information |
| YY80 0228 | Finder E - Wire Cell 5 Time Slice 4&5 Information |
| YY80 022C | Finder E - Wire Cell 6 Time Slice 0&1 Information |
| YY80 0230 | Finder E - Wire Cell 6 Time Slice 2&3 Information |
| YY80 0234 | Finder E - Wire Cell 6 Time Slice 4&5 Information |
| YY80 0238 | Finder E - Wire Cell 7 Time Slice 0&1 Information |
| YY80 023C | Finder E - Wire Cell 7 Time Slice 2&3 Information |
| YY80 0240 | Finder E - Wire Cell 7 Time Slice 4&5 Information |

L2 Buffer Space (NOTE: All L2 Buffers are Read Only)

YY90 0000 L2 Buffer 0 Header Word

| <u>Bit</u> | <u>Function</u> |
|------------|---|
| 0-7 | Bunch ID: 8 bit counter from Bunch Zero |
| 8-12 | Geographical Address |
| 13-22 | Module Serial Number |
| 23-31 | Module Type |

YY90 0004 Finder A - Cell 0,1 Segment Information (segment info passed on bits 30:0)

| <u>Bit</u> | <u>Function</u> |
|------------|-----------------------|
| 0-11 | Cell 0 - Pixel (11:0) |
| 12 | Cell 0 - B0 Marker |
| 13 | Cell 0 - W0 Marker |
| 14 | Cell 0 - Error Marker |
| 15 | Undefined |
| 16-27 | Cell 1 - Pixel (11:0) |
| 28 | Cell 1 - B0 Marker |
| 29 | Cell 1 - W0 Marker |
| 30 | Cell 1 - Error Marker |
| 31 | Undefined |

YY90 0008 Finder A - Cell 2,3 Segment Information

YY90 000C Finder A - Cell 4,5 Segment Information

YY90 0010 Finder A - Cell 6,7 Segment Information

YY90 0014 Finder B - Cell 0,1 Segment Information

YY90 0018 Finder B - Cell 2,3 Segment Information

YY90 001C Finder B - Cell 4,5 Segment Information

YY90 0020 Finder B - Cell 6,7 Segment Information

YY90 0024 Finder C - Cell 0,1 Segment Information

YY90 0028 Finder C - Cell 2,3 Segment Information

YY90 002C Finder C - Cell 4,5 Segment Information

YY90 0030 Finder C - Cell 6,7 Segment Information

YY90 0034 Finder D - Cell 0,1 Segment Information

YY90 0038 Finder D - Cell 2,3 Segment Information

YY90 003C Finder D - Cell 4,5 Segment Information

YY90 0040 Finder D - Cell 6,7 Segment Information

YY90 0044 Finder E - Cell 0,1 Segment Information

YY90 0048 Finder E - Cell 2,3 Segment Information

YY90 005C Finder E - Cell 4,5 Segment Information

YY90 0060 Finder E - Cell 6,7 Segment Information

| | |
|-----------|---|
| YY90 0064 | Finder A - Wire Cell 0 Time Slice 0&1 Information |
| | <u>Bit</u> <u>Function</u> |
| | 0-11 Wire Data time slice 0 (11:0) |
| | 12-23 Wire Data time slice 1 (11:0) |
| | 24 B0 Marker |
| | 25 W0 Marker |
| | 26 Error Marker |
| YY90 0068 | Finder A - Wire Cell 0 Time Slice 2&3 Information |
| YY90 006C | Finder A - Wire Cell 0 Time Slice 4&5 Information |
| YY90 0070 | Finder A - Wire Cell 1 Time Slice 0&1 Information |
| YY90 0074 | Finder A - Wire Cell 1 Time Slice 2&3 Information |
| YY90 0078 | Finder A - Wire Cell 1 Time Slice 4&5 Information |
| YY90 007C | Finder A - Wire Cell 2 Time Slice 0&1 Information |
| YY90 0080 | Finder A - Wire Cell 2 Time Slice 2&3 Information |
| YY90 0084 | Finder A - Wire Cell 2 Time Slice 4&5 Information |
| YY90 0088 | Finder A - Wire Cell 3 Time Slice 0&1 Information |
| YY90 008C | Finder A - Wire Cell 3 Time Slice 2&3 Information |
| YY90 0090 | Finder A - Wire Cell 3 Time Slice 4&5 Information |
| YY90 0094 | Finder A - Wire Cell 4 Time Slice 0&1 Information |
| YY90 0098 | Finder A - Wire Cell 4 Time Slice 2&3 Information |
| YY90 009C | Finder A - Wire Cell 4 Time Slice 4&5 Information |
| YY90 00A0 | Finder A - Wire Cell 5 Time Slice 0&1 Information |
| YY90 00A4 | Finder A - Wire Cell 5 Time Slice 2&3 Information |
| YY90 00A8 | Finder A - Wire Cell 5 Time Slice 4&5 Information |
| YY90 00AC | Finder A - Wire Cell 6 Time Slice 0&1 Information |
| YY90 00B0 | Finder A - Wire Cell 6 Time Slice 2&3 Information |
| YY90 00B4 | Finder A - Wire Cell 6 Time Slice 4&5 Information |
| YY90 00B8 | Finder A - Wire Cell 7 Time Slice 0&1 Information |
| YY90 00BC | Finder A - Wire Cell 7 Time Slice 2&3 Information |
| YY90 00C0 | Finder A - Wire Cell 7 Time Slice 4&5 Information |
| YY90 00C4 | Finder B - Wire Cell 0 Time Slice 0&1 Information |
| YY90 00C8 | Finder B - Wire Cell 0 Time Slice 2&3 Information |
| YY90 00CC | Finder B - Wire Cell 0 Time Slice 4&5 Information |
| YY90 00D0 | Finder B - Wire Cell 1 Time Slice 0&1 Information |
| YY90 00D4 | Finder B - Wire Cell 1 Time Slice 2&3 Information |
| YY90 00D8 | Finder B - Wire Cell 1 Time Slice 4&5 Information |
| YY90 00DC | Finder B - Wire Cell 2 Time Slice 0&1 Information |
| YY90 00E0 | Finder B - Wire Cell 2 Time Slice 2&3 Information |
| YY90 00E4 | Finder B - Wire Cell 2 Time Slice 4&5 Information |
| YY90 00E8 | Finder B - Wire Cell 3 Time Slice 0&1 Information |
| YY90 00EC | Finder B - Wire Cell 3 Time Slice 2&3 Information |
| YY90 00F0 | Finder B - Wire Cell 3 Time Slice 4&5 Information |
| YY90 00F4 | Finder B - Wire Cell 4 Time Slice 0&1 Information |
| YY90 00F8 | Finder B - Wire Cell 4 Time Slice 2&3 Information |
| YY90 00FC | Finder B - Wire Cell 4 Time Slice 4&5 Information |

| | |
|-----------|---|
| YY90 0100 | Finder B - Wire Cell 5 Time Slice 0&1 Information |
| YY90 0104 | Finder B - Wire Cell 5 Time Slice 2&3 Information |
| YY90 0108 | Finder B - Wire Cell 5 Time Slice 4&5 Information |
| YY90 010C | Finder B - Wire Cell 6 Time Slice 0&1 Information |
| YY90 0110 | Finder B - Wire Cell 6 Time Slice 2&3 Information |
| YY90 0114 | Finder B - Wire Cell 6 Time Slice 4&5 Information |
| YY90 0118 | Finder B - Wire Cell 7 Time Slice 0&1 Information |
| YY90 011C | Finder B - Wire Cell 7 Time Slice 2&3 Information |
| YY90 0120 | Finder B - Wire Cell 7 Time Slice 4&5 Information |
| | |
| YY90 0124 | Finder C - Wire Cell 0 Time Slice 0&1 Information |
| YY90 0128 | Finder C - Wire Cell 0 Time Slice 2&3 Information |
| YY90 012C | Finder C - Wire Cell 0 Time Slice 4&5 Information |
| YY90 0130 | Finder C - Wire Cell 1 Time Slice 0&1 Information |
| YY90 0134 | Finder C - Wire Cell 1 Time Slice 2&3 Information |
| YY90 0138 | Finder C - Wire Cell 1 Time Slice 4&5 Information |
| YY90 013C | Finder C - Wire Cell 2 Time Slice 0&1 Information |
| YY90 0140 | Finder C - Wire Cell 2 Time Slice 2&3 Information |
| YY90 0144 | Finder C - Wire Cell 2 Time Slice 4&5 Information |
| YY90 0148 | Finder C - Wire Cell 3 Time Slice 0&1 Information |
| YY90 014C | Finder C - Wire Cell 3 Time Slice 2&3 Information |
| YY90 0150 | Finder C - Wire Cell 3 Time Slice 4&5 Information |
| YY90 0154 | Finder C - Wire Cell 4 Time Slice 0&1 Information |
| YY90 0158 | Finder C - Wire Cell 4 Time Slice 2&3 Information |
| YY90 015C | Finder C - Wire Cell 4 Time Slice 4&5 Information |
| YY90 0160 | Finder C - Wire Cell 5 Time Slice 0&1 Information |
| YY90 0164 | Finder C - Wire Cell 5 Time Slice 2&3 Information |
| YY90 0168 | Finder C - Wire Cell 5 Time Slice 4&5 Information |
| YY90 016C | Finder C - Wire Cell 6 Time Slice 0&1 Information |
| YY90 0170 | Finder C - Wire Cell 6 Time Slice 2&3 Information |
| YY90 0174 | Finder C - Wire Cell 6 Time Slice 4&5 Information |
| YY90 0178 | Finder C - Wire Cell 7 Time Slice 0&1 Information |
| YY90 017C | Finder C - Wire Cell 7 Time Slice 2&3 Information |
| YY90 0180 | Finder C - Wire Cell 7 Time Slice 4&5 Information |
| | |
| YY90 0184 | Finder D - Wire Cell 0 Time Slice 0&1 Information |
| YY90 0188 | Finder D - Wire Cell 0 Time Slice 2&3 Information |
| YY90 018C | Finder D - Wire Cell 0 Time Slice 4&5 Information |
| YY90 0190 | Finder D - Wire Cell 1 Time Slice 0&1 Information |
| YY90 0194 | Finder D - Wire Cell 1 Time Slice 2&3 Information |
| YY90 0198 | Finder D - Wire Cell 1 Time Slice 4&5 Information |
| YY90 019C | Finder D - Wire Cell 2 Time Slice 0&1 Information |
| YY90 01A0 | Finder D - Wire Cell 2 Time Slice 2&3 Information |
| YY90 01A4 | Finder D - Wire Cell 2 Time Slice 4&5 Information |
| YY90 01A8 | Finder D - Wire Cell 3 Time Slice 0&1 Information |
| YY90 01AC | Finder D - Wire Cell 3 Time Slice 2&3 Information |

| | |
|-----------|---|
| YY90 01B0 | Finder D - Wire Cell 3 Time Slice 4&5 Information |
| YY90 01B4 | Finder D - Wire Cell 4 Time Slice 0&1 Information |
| YY90 01B8 | Finder D - Wire Cell 4 Time Slice 2&3 Information |
| YY90 01BC | Finder D - Wire Cell 4 Time Slice 4&5 Information |
| YY90 01C0 | Finder D - Wire Cell 5 Time Slice 0&1 Information |
| YY90 01C4 | Finder D - Wire Cell 5 Time Slice 2&3 Information |
| YY90 01C8 | Finder D - Wire Cell 5 Time Slice 4&5 Information |
| YY90 01CC | Finder D - Wire Cell 6 Time Slice 0&1 Information |
| YY90 01D0 | Finder D - Wire Cell 6 Time Slice 2&3 Information |
| YY90 01D4 | Finder D - Wire Cell 6 Time Slice 4&5 Information |
| YY90 01D8 | Finder D - Wire Cell 7 Time Slice 0&1 Information |
| YY90 01DC | Finder D - Wire Cell 7 Time Slice 2&3 Information |
| YY90 01E0 | Finder D - Wire Cell 7 Time Slice 4&5 Information |
| | |
| YY90 01E4 | Finder E - Wire Cell 0 Time Slice 0&1 Information |
| YY90 01E8 | Finder E - Wire Cell 0 Time Slice 2&3 Information |
| YY90 01EC | Finder E - Wire Cell 0 Time Slice 4&5 Information |
| YY90 01F0 | Finder E - Wire Cell 1 Time Slice 0&1 Information |
| YY90 01F4 | Finder E - Wire Cell 1 Time Slice 2&3 Information |
| YY90 01F8 | Finder E - Wire Cell 1 Time Slice 4&5 Information |
| YY90 01FC | Finder E - Wire Cell 2 Time Slice 0&1 Information |
| YY90 0200 | Finder E - Wire Cell 2 Time Slice 2&3 Information |
| YY90 0204 | Finder E - Wire Cell 2 Time Slice 4&5 Information |
| YY90 0208 | Finder E - Wire Cell 3 Time Slice 0&1 Information |
| YY90 020C | Finder E - Wire Cell 3 Time Slice 2&3 Information |
| YY90 0210 | Finder E - Wire Cell 3 Time Slice 4&5 Information |
| YY90 0214 | Finder E - Wire Cell 4 Time Slice 0&1 Information |
| YY90 0218 | Finder E - Wire Cell 4 Time Slice 2&3 Information |
| YY90 021C | Finder E - Wire Cell 4 Time Slice 4&5 Information |
| YY90 0220 | Finder E - Wire Cell 5 Time Slice 0&1 Information |
| YY90 0224 | Finder E - Wire Cell 5 Time Slice 2&3 Information |
| YY90 0228 | Finder E - Wire Cell 5 Time Slice 4&5 Information |
| YY90 022C | Finder E - Wire Cell 6 Time Slice 0&1 Information |
| YY90 0230 | Finder E - Wire Cell 6 Time Slice 2&3 Information |
| YY90 0234 | Finder E - Wire Cell 6 Time Slice 4&5 Information |
| YY90 0238 | Finder E - Wire Cell 7 Time Slice 0&1 Information |
| YY90 023C | Finder E - Wire Cell 7 Time Slice 2&3 Information |
| YY90 0240 | Finder E - Wire Cell 7 Time Slice 4&5 Information |

L2 Buffer Space (NOTE: All L2 Buffers are Read Only)

YYA0 0000 L2 Buffer 0 Header Word

| <u>Bit</u> | <u>Function</u> |
|------------|---|
| 0-7 | Bunch ID: 8 bit counter from Bunch Zero |
| 8-12 | Geographical Address |
| 13-22 | Module Serial Number |
| 23-31 | Module Type |

YYA0 0004 Finder A - Cell 0,1 Segment Information (segment info passed on bits 30:0)

| <u>Bit</u> | <u>Function</u> |
|------------|-----------------------|
| 0-11 | Cell 0 - Pixel (11:0) |
| 12 | Cell 0 - B0 Marker |
| 13 | Cell 0 - W0 Marker |
| 14 | Cell 0 - Error Marker |
| 15 | Undefined |
| 16-27 | Cell 1 - Pixel (11:0) |
| 28 | Cell 1 - B0 Marker |
| 29 | Cell 1 - W0 Marker |
| 30 | Cell 1 - Error Marker |
| 31 | Undefined |

YYA0 0008 Finder A - Cell 2,3 Segment Information

YYA0 000C Finder A - Cell 4,5 Segment Information

YYA0 0010 Finder A - Cell 6,7 Segment Information

YYA0 0014 Finder B - Cell 0,1 Segment Information

YYA0 0018 Finder B - Cell 2,3 Segment Information

YYA0 001C Finder B - Cell 4,5 Segment Information

YYA0 0020 Finder B - Cell 6,7 Segment Information

YYA0 0024 Finder C - Cell 0,1 Segment Information

YYA0 0028 Finder C - Cell 2,3 Segment Information

YYA0 002C Finder C - Cell 4,5 Segment Information

YYA0 0030 Finder C - Cell 6,7 Segment Information

YYA0 0034 Finder D - Cell 0,1 Segment Information

YYA0 0038 Finder D - Cell 2,3 Segment Information

YYA0 003C Finder D - Cell 4,5 Segment Information

YYA0 0040 Finder D - Cell 6,7 Segment Information

YYA0 0044 Finder E - Cell 0,1 Segment Information

YYA0 0048 Finder E - Cell 2,3 Segment Information

YYA0 005C Finder E - Cell 4,5 Segment Information

YYA0 0060 Finder E - Cell 6,7 Segment Information

| | |
|-----------|---|
| YYA0 0064 | Finder A - Wire Cell 0 Time Slice 0&1 Information |
| | <u>Bit</u> <u>Function</u> |
| | 0-11 Wire Data time slice 0 (11:0) |
| | 12-23 Wire Data time slice 1 (11:0) |
| | 24 B0 Marker |
| | 25 W0 Marker |
| | 26 Error Marker |
| YYA0 0068 | Finder A - Wire Cell 0 Time Slice 2&3 Information |
| YYA0 006C | Finder A - Wire Cell 0 Time Slice 4&5 Information |
| YYA0 0070 | Finder A - Wire Cell 1 Time Slice 0&1 Information |
| YYA0 0074 | Finder A - Wire Cell 1 Time Slice 2&3 Information |
| YYA0 0078 | Finder A - Wire Cell 1 Time Slice 4&5 Information |
| YYA0 007C | Finder A - Wire Cell 2 Time Slice 0&1 Information |
| YYA0 0080 | Finder A - Wire Cell 2 Time Slice 2&3 Information |
| YYA0 0084 | Finder A - Wire Cell 2 Time Slice 4&5 Information |
| YYA0 0088 | Finder A - Wire Cell 3 Time Slice 0&1 Information |
| YYA0 008C | Finder A - Wire Cell 3 Time Slice 2&3 Information |
| YYA0 0090 | Finder A - Wire Cell 3 Time Slice 4&5 Information |
| YYA0 0094 | Finder A - Wire Cell 4 Time Slice 0&1 Information |
| YYA0 0098 | Finder A - Wire Cell 4 Time Slice 2&3 Information |
| YYA0 009C | Finder A - Wire Cell 4 Time Slice 4&5 Information |
| YYA0 00A0 | Finder A - Wire Cell 5 Time Slice 0&1 Information |
| YYA0 00A4 | Finder A - Wire Cell 5 Time Slice 2&3 Information |
| YYA0 00A8 | Finder A - Wire Cell 5 Time Slice 4&5 Information |
| YYA0 00AC | Finder A - Wire Cell 6 Time Slice 0&1 Information |
| YYA0 00B0 | Finder A - Wire Cell 6 Time Slice 2&3 Information |
| YYA0 00B4 | Finder A - Wire Cell 6 Time Slice 4&5 Information |
| YYA0 00B8 | Finder A - Wire Cell 7 Time Slice 0&1 Information |
| YYA0 00BC | Finder A - Wire Cell 7 Time Slice 2&3 Information |
| YYA0 00C0 | Finder A - Wire Cell 7 Time Slice 4&5 Information |
| YYA0 00C4 | Finder B - Wire Cell 0 Time Slice 0&1 Information |
| YYA0 00C8 | Finder B - Wire Cell 0 Time Slice 2&3 Information |
| YYA0 00CC | Finder B - Wire Cell 0 Time Slice 4&5 Information |
| YYA0 00D0 | Finder B - Wire Cell 1 Time Slice 0&1 Information |
| YYA0 00D4 | Finder B - Wire Cell 1 Time Slice 2&3 Information |
| YYA0 00D8 | Finder B - Wire Cell 1 Time Slice 4&5 Information |
| YYA0 00DC | Finder B - Wire Cell 2 Time Slice 0&1 Information |
| YYA0 00E0 | Finder B - Wire Cell 2 Time Slice 2&3 Information |
| YYA0 00E4 | Finder B - Wire Cell 2 Time Slice 4&5 Information |
| YYA0 00E8 | Finder B - Wire Cell 3 Time Slice 0&1 Information |
| YYA0 00EC | Finder B - Wire Cell 3 Time Slice 2&3 Information |
| YYA0 00F0 | Finder B - Wire Cell 3 Time Slice 4&5 Information |
| YYA0 00F4 | Finder B - Wire Cell 4 Time Slice 0&1 Information |
| YYA0 00F8 | Finder B - Wire Cell 4 Time Slice 2&3 Information |
| YYA0 00FC | Finder B - Wire Cell 4 Time Slice 4&5 Information |

| | |
|-----------|---|
| YYA0 0100 | Finder B - Wire Cell 5 Time Slice 0&1 Information |
| YYA0 0104 | Finder B - Wire Cell 5 Time Slice 2&3 Information |
| YYA0 0108 | Finder B - Wire Cell 5 Time Slice 4&5 Information |
| YYA0 010C | Finder B - Wire Cell 6 Time Slice 0&1 Information |
| YYA0 0110 | Finder B - Wire Cell 6 Time Slice 2&3 Information |
| YYA0 0114 | Finder B - Wire Cell 6 Time Slice 4&5 Information |
| YYA0 0118 | Finder B - Wire Cell 7 Time Slice 0&1 Information |
| YYA0 011C | Finder B - Wire Cell 7 Time Slice 2&3 Information |
| YYA0 0120 | Finder B - Wire Cell 7 Time Slice 4&5 Information |
| YYA0 0124 | Finder C - Wire Cell 0 Time Slice 0&1 Information |
| YYA0 0128 | Finder C - Wire Cell 0 Time Slice 2&3 Information |
| YYA0 012C | Finder C - Wire Cell 0 Time Slice 4&5 Information |
| YYA0 0130 | Finder C - Wire Cell 1 Time Slice 0&1 Information |
| YYA0 0134 | Finder C - Wire Cell 1 Time Slice 2&3 Information |
| YYA0 0138 | Finder C - Wire Cell 1 Time Slice 4&5 Information |
| YYA0 013C | Finder C - Wire Cell 2 Time Slice 0&1 Information |
| YYA0 0140 | Finder C - Wire Cell 2 Time Slice 2&3 Information |
| YYA0 0144 | Finder C - Wire Cell 2 Time Slice 4&5 Information |
| YYA0 0148 | Finder C - Wire Cell 3 Time Slice 0&1 Information |
| YYA0 014C | Finder C - Wire Cell 3 Time Slice 2&3 Information |
| YYA0 0150 | Finder C - Wire Cell 3 Time Slice 4&5 Information |
| YYA0 0154 | Finder C - Wire Cell 4 Time Slice 0&1 Information |
| YYA0 0158 | Finder C - Wire Cell 4 Time Slice 2&3 Information |
| YYA0 015C | Finder C - Wire Cell 4 Time Slice 4&5 Information |
| YYA0 0160 | Finder C - Wire Cell 5 Time Slice 0&1 Information |
| YYA0 0164 | Finder C - Wire Cell 5 Time Slice 2&3 Information |
| YYA0 0168 | Finder C - Wire Cell 5 Time Slice 4&5 Information |
| YYA0 016C | Finder C - Wire Cell 6 Time Slice 0&1 Information |
| YYA0 0170 | Finder C - Wire Cell 6 Time Slice 2&3 Information |
| YYA0 0174 | Finder C - Wire Cell 6 Time Slice 4&5 Information |
| YYA0 0178 | Finder C - Wire Cell 7 Time Slice 0&1 Information |
| YYA0 017C | Finder C - Wire Cell 7 Time Slice 2&3 Information |
| YYA0 0180 | Finder C - Wire Cell 7 Time Slice 4&5 Information |
| YYA0 0184 | Finder D - Wire Cell 0 Time Slice 0&1 Information |
| YYA0 0188 | Finder D - Wire Cell 0 Time Slice 2&3 Information |
| YYA0 018C | Finder D - Wire Cell 0 Time Slice 4&5 Information |
| YYA0 0190 | Finder D - Wire Cell 1 Time Slice 0&1 Information |
| YYA0 0194 | Finder D - Wire Cell 1 Time Slice 2&3 Information |
| YYA0 0198 | Finder D - Wire Cell 1 Time Slice 4&5 Information |
| YYA0 019C | Finder D - Wire Cell 2 Time Slice 0&1 Information |
| YYA0 01A0 | Finder D - Wire Cell 2 Time Slice 2&3 Information |
| YYA0 01A4 | Finder D - Wire Cell 2 Time Slice 4&5 Information |
| YYA0 01A8 | Finder D - Wire Cell 3 Time Slice 0&1 Information |
| YYA0 01AC | Finder D - Wire Cell 3 Time Slice 2&3 Information |

| | |
|-----------|---|
| YYA0 01B0 | Finder D - Wire Cell 3 Time Slice 4&5 Information |
| YYA0 01B4 | Finder D - Wire Cell 4 Time Slice 0&1 Information |
| YYA0 01B8 | Finder D - Wire Cell 4 Time Slice 2&3 Information |
| YYA0 01BC | Finder D - Wire Cell 4 Time Slice 4&5 Information |
| YYA0 01C0 | Finder D - Wire Cell 5 Time Slice 0&1 Information |
| YYA0 01C4 | Finder D - Wire Cell 5 Time Slice 2&3 Information |
| YYA0 01C8 | Finder D - Wire Cell 5 Time Slice 4&5 Information |
| YYA0 01CC | Finder D - Wire Cell 6 Time Slice 0&1 Information |
| YYA0 01D0 | Finder D - Wire Cell 6 Time Slice 2&3 Information |
| YYA0 01D4 | Finder D - Wire Cell 6 Time Slice 4&5 Information |
| YYA0 01D8 | Finder D - Wire Cell 7 Time Slice 0&1 Information |
| YYA0 01DC | Finder D - Wire Cell 7 Time Slice 2&3 Information |
| YYA0 01E0 | Finder D - Wire Cell 7 Time Slice 4&5 Information |
| YYA0 01E4 | Finder E - Wire Cell 0 Time Slice 0&1 Information |
| YYA0 01E8 | Finder E - Wire Cell 0 Time Slice 2&3 Information |
| YYA0 01EC | Finder E - Wire Cell 0 Time Slice 4&5 Information |
| YYA0 01F0 | Finder E - Wire Cell 1 Time Slice 0&1 Information |
| YYA0 01F4 | Finder E - Wire Cell 1 Time Slice 2&3 Information |
| YYA0 01F8 | Finder E - Wire Cell 1 Time Slice 4&5 Information |
| YYA0 01FC | Finder E - Wire Cell 2 Time Slice 0&1 Information |
| YYA0 0200 | Finder E - Wire Cell 2 Time Slice 2&3 Information |
| YYA0 0204 | Finder E - Wire Cell 2 Time Slice 4&5 Information |
| YYA0 0208 | Finder E - Wire Cell 3 Time Slice 0&1 Information |
| YYA0 020C | Finder E - Wire Cell 3 Time Slice 2&3 Information |
| YYA0 0210 | Finder E - Wire Cell 3 Time Slice 4&5 Information |
| YYA0 0214 | Finder E - Wire Cell 4 Time Slice 0&1 Information |
| YYA0 0218 | Finder E - Wire Cell 4 Time Slice 2&3 Information |
| YYA0 021C | Finder E - Wire Cell 4 Time Slice 4&5 Information |
| YYA0 0220 | Finder E - Wire Cell 5 Time Slice 0&1 Information |
| YYA0 0224 | Finder E - Wire Cell 5 Time Slice 2&3 Information |
| YYA0 0228 | Finder E - Wire Cell 5 Time Slice 4&5 Information |
| YYA0 022C | Finder E - Wire Cell 6 Time Slice 0&1 Information |
| YYA0 0230 | Finder E - Wire Cell 6 Time Slice 2&3 Information |
| YYA0 0234 | Finder E - Wire Cell 6 Time Slice 4&5 Information |
| YYA0 0238 | Finder E - Wire Cell 7 Time Slice 0&1 Information |
| YYA0 023C | Finder E - Wire Cell 7 Time Slice 2&3 Information |
| YYA0 0240 | Finder E - Wire Cell 7 Time Slice 4&5 Information |

L2 Buffer Space (NOTE: All L2 Buffers are Read Only)

YYB0 0000 L2 Buffer 0 Header Word

| <u>Bit</u> | <u>Function</u> |
|------------|---|
| 0-7 | Bunch ID: 8 bit counter from Bunch Zero |
| 8-12 | Geographical Address |
| 13-22 | Module Serial Number |
| 23-31 | Module Type |

YYB0 0004 Finder A - Cell 0,1 Segment Information (segment info passed on bits 30:0)

| <u>Bit</u> | <u>Function</u> |
|------------|-----------------------|
| 0-11 | Cell 0 - Pixel (11:0) |
| 12 | Cell 0 - B0 Marker |
| 13 | Cell 0 - W0 Marker |
| 14 | Cell 0 - Error Marker |
| 15 | Undefined |
| 16-27 | Cell 1 - Pixel (11:0) |
| 28 | Cell 1 - B0 Marker |
| 29 | Cell 1 - W0 Marker |
| 30 | Cell 1 - Error Marker |
| 31 | Undefined |

YYB0 0008 Finder A - Cell 2,3 Segment Information

YYB0 000C Finder A - Cell 4,5 Segment Information

YYB0 0010 Finder A - Cell 6,7 Segment Information

YYB0 0014 Finder B - Cell 0,1 Segment Information

YYB0 0018 Finder B - Cell 2,3 Segment Information

YYB0 001C Finder B - Cell 4,5 Segment Information

YYB0 0020 Finder B - Cell 6,7 Segment Information

YYB0 0024 Finder C - Cell 0,1 Segment Information

YYB0 0028 Finder C - Cell 2,3 Segment Information

YYB0 002C Finder C - Cell 4,5 Segment Information

YYB0 0030 Finder C - Cell 6,7 Segment Information

YYB0 0034 Finder D - Cell 0,1 Segment Information

YYB0 0038 Finder D - Cell 2,3 Segment Information

YYB0 003C Finder D - Cell 4,5 Segment Information

YYB0 0040 Finder D - Cell 6,7 Segment Information

YYB0 0044 Finder E - Cell 0,1 Segment Information

YYB0 0048 Finder E - Cell 2,3 Segment Information

YYB0 005C Finder E - Cell 4,5 Segment Information

YYB0 0060 Finder E - Cell 6,7 Segment Information

| | |
|-----------|---|
| YYB0 0064 | Finder A - Wire Cell 0 Time Slice 0&1 Information |
| | <u>Bit</u> <u>Function</u> |
| | 0-11 Wire Data time slice 0 (11:0) |
| | 12-23 Wire Data time slice 1 (11:0) |
| | 24 B0 Marker |
| | 25 W0 Marker |
| | 26 Error Marker |
| YYB0 0068 | Finder A - Wire Cell 0 Time Slice 2&3 Information |
| YYB0 006C | Finder A - Wire Cell 0 Time Slice 4&5 Information |
| YYB0 0070 | Finder A - Wire Cell 1 Time Slice 0&1 Information |
| YYB0 0074 | Finder A - Wire Cell 1 Time Slice 2&3 Information |
| YYB0 0078 | Finder A - Wire Cell 1 Time Slice 4&5 Information |
| YYB0 007C | Finder A - Wire Cell 2 Time Slice 0&1 Information |
| YYB0 0080 | Finder A - Wire Cell 2 Time Slice 2&3 Information |
| YYB0 0084 | Finder A - Wire Cell 2 Time Slice 4&5 Information |
| YYB0 0088 | Finder A - Wire Cell 3 Time Slice 0&1 Information |
| YYB0 008C | Finder A - Wire Cell 3 Time Slice 2&3 Information |
| YYB0 0090 | Finder A - Wire Cell 3 Time Slice 4&5 Information |
| YYB0 0094 | Finder A - Wire Cell 4 Time Slice 0&1 Information |
| YYB0 0098 | Finder A - Wire Cell 4 Time Slice 2&3 Information |
| YYB0 009C | Finder A - Wire Cell 4 Time Slice 4&5 Information |
| YYB0 00A0 | Finder A - Wire Cell 5 Time Slice 0&1 Information |
| YYB0 00A4 | Finder A - Wire Cell 5 Time Slice 2&3 Information |
| YYB0 00A8 | Finder A - Wire Cell 5 Time Slice 4&5 Information |
| YYB0 00AC | Finder A - Wire Cell 6 Time Slice 0&1 Information |
| YYB0 00B0 | Finder A - Wire Cell 6 Time Slice 2&3 Information |
| YYB0 00B4 | Finder A - Wire Cell 6 Time Slice 4&5 Information |
| YYB0 00B8 | Finder A - Wire Cell 7 Time Slice 0&1 Information |
| YYB0 00BC | Finder A - Wire Cell 7 Time Slice 2&3 Information |
| YYB0 00C0 | Finder A - Wire Cell 7 Time Slice 4&5 Information |
| YYB0 00C4 | Finder B - Wire Cell 0 Time Slice 0&1 Information |
| YYB0 00C8 | Finder B - Wire Cell 0 Time Slice 2&3 Information |
| YYB0 00CC | Finder B - Wire Cell 0 Time Slice 4&5 Information |
| YYB0 00D0 | Finder B - Wire Cell 1 Time Slice 0&1 Information |
| YYB0 00D4 | Finder B - Wire Cell 1 Time Slice 2&3 Information |
| YYB0 00D8 | Finder B - Wire Cell 1 Time Slice 4&5 Information |
| YYB0 00DC | Finder B - Wire Cell 2 Time Slice 0&1 Information |
| YYB0 00E0 | Finder B - Wire Cell 2 Time Slice 2&3 Information |
| YYB0 00E4 | Finder B - Wire Cell 2 Time Slice 4&5 Information |
| YYB0 00E8 | Finder B - Wire Cell 3 Time Slice 0&1 Information |
| YYB0 00EC | Finder B - Wire Cell 3 Time Slice 2&3 Information |
| YYB0 00F0 | Finder B - Wire Cell 3 Time Slice 4&5 Information |
| YYB0 00F4 | Finder B - Wire Cell 4 Time Slice 0&1 Information |
| YYB0 00F8 | Finder B - Wire Cell 4 Time Slice 2&3 Information |
| YYB0 00FC | Finder B - Wire Cell 4 Time Slice 4&5 Information |

| | |
|-----------|---|
| YYB0 0100 | Finder B - Wire Cell 5 Time Slice 0&1 Information |
| YYB0 0104 | Finder B - Wire Cell 5 Time Slice 2&3 Information |
| YYB0 0108 | Finder B - Wire Cell 5 Time Slice 4&5 Information |
| YYB0 010C | Finder B - Wire Cell 6 Time Slice 0&1 Information |
| YYB0 0110 | Finder B - Wire Cell 6 Time Slice 2&3 Information |
| YYB0 0114 | Finder B - Wire Cell 6 Time Slice 4&5 Information |
| YYB0 0118 | Finder B - Wire Cell 7 Time Slice 0&1 Information |
| YYB0 011C | Finder B - Wire Cell 7 Time Slice 2&3 Information |
| YYB0 0120 | Finder B - Wire Cell 7 Time Slice 4&5 Information |
| YYB0 0124 | Finder C - Wire Cell 0 Time Slice 0&1 Information |
| YYB0 0128 | Finder C - Wire Cell 0 Time Slice 2&3 Information |
| YYB0 012C | Finder C - Wire Cell 0 Time Slice 4&5 Information |
| YYB0 0130 | Finder C - Wire Cell 1 Time Slice 0&1 Information |
| YYB0 0134 | Finder C - Wire Cell 1 Time Slice 2&3 Information |
| YYB0 0138 | Finder C - Wire Cell 1 Time Slice 4&5 Information |
| YYB0 013C | Finder C - Wire Cell 2 Time Slice 0&1 Information |
| YYB0 0140 | Finder C - Wire Cell 2 Time Slice 2&3 Information |
| YYB0 0144 | Finder C - Wire Cell 2 Time Slice 4&5 Information |
| YYB0 0148 | Finder C - Wire Cell 3 Time Slice 0&1 Information |
| YYB0 014C | Finder C - Wire Cell 3 Time Slice 2&3 Information |
| YYB0 0150 | Finder C - Wire Cell 3 Time Slice 4&5 Information |
| YYB0 0154 | Finder C - Wire Cell 4 Time Slice 0&1 Information |
| YYB0 0158 | Finder C - Wire Cell 4 Time Slice 2&3 Information |
| YYB0 015C | Finder C - Wire Cell 4 Time Slice 4&5 Information |
| YYB0 0160 | Finder C - Wire Cell 5 Time Slice 0&1 Information |
| YYB0 0164 | Finder C - Wire Cell 5 Time Slice 2&3 Information |
| YYB0 0168 | Finder C - Wire Cell 5 Time Slice 4&5 Information |
| YYB0 016C | Finder C - Wire Cell 6 Time Slice 0&1 Information |
| YYB0 0170 | Finder C - Wire Cell 6 Time Slice 2&3 Information |
| YYB0 0174 | Finder C - Wire Cell 6 Time Slice 4&5 Information |
| YYB0 0178 | Finder C - Wire Cell 7 Time Slice 0&1 Information |
| YYB0 017C | Finder C - Wire Cell 7 Time Slice 2&3 Information |
| YYB0 0180 | Finder C - Wire Cell 7 Time Slice 4&5 Information |
| YYB0 0184 | Finder D - Wire Cell 0 Time Slice 0&1 Information |
| YYB0 0188 | Finder D - Wire Cell 0 Time Slice 2&3 Information |
| YYB0 018C | Finder D - Wire Cell 0 Time Slice 4&5 Information |
| YYB0 0190 | Finder D - Wire Cell 1 Time Slice 0&1 Information |
| YYB0 0194 | Finder D - Wire Cell 1 Time Slice 2&3 Information |
| YYB0 0198 | Finder D - Wire Cell 1 Time Slice 4&5 Information |
| YYB0 019C | Finder D - Wire Cell 2 Time Slice 0&1 Information |
| YYB0 01A0 | Finder D - Wire Cell 2 Time Slice 2&3 Information |
| YYB0 01A4 | Finder D - Wire Cell 2 Time Slice 4&5 Information |
| YYB0 01A8 | Finder D - Wire Cell 3 Time Slice 0&1 Information |
| YYB0 01AC | Finder D - Wire Cell 3 Time Slice 2&3 Information |

| | |
|-----------|---|
| YYB0 01B0 | Finder D - Wire Cell 3 Time Slice 4&5 Information |
| YYB0 01B4 | Finder D - Wire Cell 4 Time Slice 0&1 Information |
| YYB0 01B8 | Finder D - Wire Cell 4 Time Slice 2&3 Information |
| YYB0 01BC | Finder D - Wire Cell 4 Time Slice 4&5 Information |
| YYB0 01C0 | Finder D - Wire Cell 5 Time Slice 0&1 Information |
| YYB0 01C4 | Finder D - Wire Cell 5 Time Slice 2&3 Information |
| YYB0 01C8 | Finder D - Wire Cell 5 Time Slice 4&5 Information |
| YYB0 01CC | Finder D - Wire Cell 6 Time Slice 0&1 Information |
| YYB0 01D0 | Finder D - Wire Cell 6 Time Slice 2&3 Information |
| YYB0 01D4 | Finder D - Wire Cell 6 Time Slice 4&5 Information |
| YYB0 01D8 | Finder D - Wire Cell 7 Time Slice 0&1 Information |
| YYB0 01DC | Finder D - Wire Cell 7 Time Slice 2&3 Information |
| YYB0 01E0 | Finder D - Wire Cell 7 Time Slice 4&5 Information |
| YYB0 01E4 | Finder E - Wire Cell 0 Time Slice 0&1 Information |
| YYB0 01E8 | Finder E - Wire Cell 0 Time Slice 2&3 Information |
| YYB0 01EC | Finder E - Wire Cell 0 Time Slice 4&5 Information |
| YYB0 01F0 | Finder E - Wire Cell 1 Time Slice 0&1 Information |
| YYB0 01F4 | Finder E - Wire Cell 1 Time Slice 2&3 Information |
| YYB0 01F8 | Finder E - Wire Cell 1 Time Slice 4&5 Information |
| YYB0 01FC | Finder E - Wire Cell 2 Time Slice 0&1 Information |
| YYB0 0200 | Finder E - Wire Cell 2 Time Slice 2&3 Information |
| YYB0 0204 | Finder E - Wire Cell 2 Time Slice 4&5 Information |
| YYB0 0208 | Finder E - Wire Cell 3 Time Slice 0&1 Information |
| YYB0 020C | Finder E - Wire Cell 3 Time Slice 2&3 Information |
| YYB0 0210 | Finder E - Wire Cell 3 Time Slice 4&5 Information |
| YYB0 0214 | Finder E - Wire Cell 4 Time Slice 0&1 Information |
| YYB0 0218 | Finder E - Wire Cell 4 Time Slice 2&3 Information |
| YYB0 021C | Finder E - Wire Cell 4 Time Slice 4&5 Information |
| YYB0 0220 | Finder E - Wire Cell 5 Time Slice 0&1 Information |
| YYB0 0224 | Finder E - Wire Cell 5 Time Slice 2&3 Information |
| YYB0 0228 | Finder E - Wire Cell 5 Time Slice 4&5 Information |
| YYB0 022C | Finder E - Wire Cell 6 Time Slice 0&1 Information |
| YYB0 0230 | Finder E - Wire Cell 6 Time Slice 2&3 Information |
| YYB0 0234 | Finder E - Wire Cell 6 Time Slice 4&5 Information |
| YYB0 0238 | Finder E - Wire Cell 7 Time Slice 0&1 Information |
| YYB0 023C | Finder E - Wire Cell 7 Time Slice 2&3 Information |
| YYB0 0240 | Finder E - Wire Cell 7 Time Slice 4&5 Information |

YYC0 0000 - YYFF FFFC Flash RAM Data Register (**R/W**)

Lower 16 bits

**(8-Megabit Flash Ram for download configuration for
the Finder Module's PLDs{Alignment, Finder & Pixel Chips})**

YY is the VME geographical address of the Finder board.